The RUBBER AGE

June, 1945

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JUL 2 1945
DETROIT

TO THE AMERICAN PEOPLE:

Your sons, husbands and brothers who are standing today upon the battlefronts are fighting for more than victory in war. They are fighting for a new world of freedom and peace.

We, upon whom has been placed the responsibility of leading the American forces, appeal to you with all possible earnestness to invest in War Bonds to the fullest extent of your capacity.

Give us not only the needed implements of war, but the assurance and backing of a united people so necessary to hasten the victory and speed the return of your fighting men.

George C. Marshall, William D. Leahy, Douglas MacArthur, Ernest J. King, Dwight D. Eisenhower, Chester W. Nimitz, H. H. Arnold

Support the 7th War Loan Drive

Newsletter No. 6
JUNE, 1945

Published by Rubber Chemicals Division of DUPONT

THIONEX

OUTSTANDING ACCELERATOR FOR GR-S

THIONEX — tetra-methyl-thiuram-monosulfide — widely used in rubber processing, has become one of the most important and versatile accelerators for the many different types of GR-S compounds. Its low price makes it economical either as a primary or as a secondary accelerator. Further economy and other advantages for certain GR-S products may be gained by activating it with other accelerators, such as 2-MT, Barak and Accelerator 808, to produce fast curing, economical, high quality stocks, or by its use as a secondary accelerator to activate Zenite, 2-MT, MBTS, Acrin and others.

ACCELERATION OF GR-S with Thionex has these advantages:

1. **Safety in processing.**
2. **Rapid curing at vulcanizing temperatures.**
3. **Broad, flat curing range.**
4. **High tensile strength.**
5. **Excellent aging and superior heat resistance.**
6. **Versatility of activation.**
7. **Acceleration economy.**

DELAYED ACTION OR LAG of Thionex acceleration makes for safety in processing, with very fast rate of cure at vulcanizing temperatures. GR-S compounds accelerated with Thionex may be exposed to temperatures nearly as high as the curing temperature for a short period of time without setting up. After this period of lag the cure proceeds rapidly to completion — a characteristic which has brought Thionex widespread use in a variety of products such as CV wire insulation, drug sundries, mechanical goods, heels and soles, and inner tubes.

THIONEX accelerated GR-S compounds have a long curing range with very little tendency toward over cure. There is practically no change in tensile strength, modulus elongation at break, tear strength or hardness when the time of cure is extended from 30 to 120 minutes.

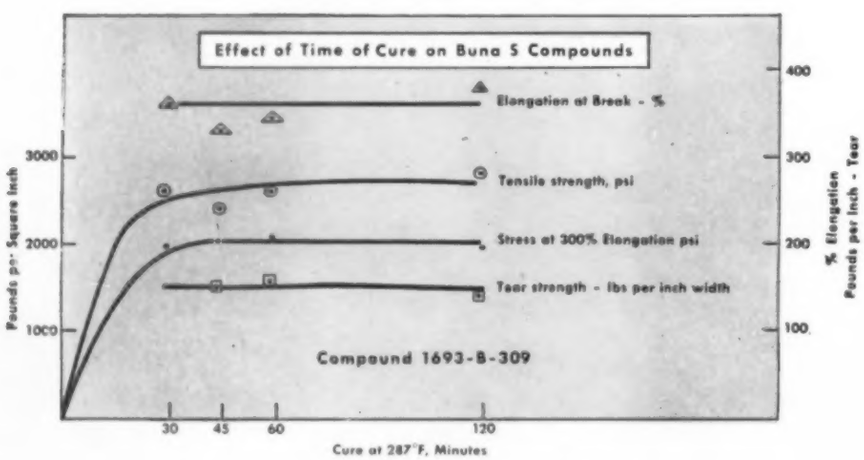


TABLE I

	Original	Aged in 100° C. Oven	
		2 Days	4 Days
Stress at 200% Elongation—psi	650	850	850
Tensile Strength at Break—psi	2525	2650	2325
Elongation at Break—%	440	410	390
Hardness—Shore Durometer	65	68	69

The effects on these properties of varying the time of cure is shown graphically in the accompanying chart.

PROPER AMOUNT of Thionex to be used depends on the nature of the compound, type of cure, choice and type of fillers, and sulfur content. From 0.25% to 4.0% may be used, depending on the characteristics desired in the finished article. Either over or under acceleration will impair the tensile properties of a GR-S compound and for this reason, the proper ratio of Thionex to sulfur should be maintained for best results.

Normally in the neighborhood of 2.0% sulfur is recommended in GR-S compounds accelerated with Thionex, but amounts up to 3.0% or 4.0% may be used to obtain improved dynamic properties. Low sulfur-high Thionex ratios are recommended for applications where a high degree of heat resistance is required. Results of physical tests shown in Table I on a typical black loaded GR-S compound accelerated with 1.5% Thionex and 0.75% sulfur illustrate the excellent heat resistance that is obtainable with this combination.

More detailed information concerning the compounding of GR-S, including specific acceleration suggestions, is presented in various BL reports. It is available to rubber technologists upon request.

BACK THE ATTACK WITH WAR BONDS

DUPONT

RUBBER CHEMICALS DIVISION

BETTER THINGS FOR BETTER LIVING . . . Through Chemistry

THE RUBBER AGE, published monthly by The Palmerton Publishing Co., Inc., Printing Office, East Stroudsburg, Pa. Editorial and Advertising Offices at 250 West 57th Street, New York 19, N. Y. Entered as second class matter October 20, 1933, at the Post Office at East Stroudsburg, Pa., under the Act of March 3, 1879. Subscription in United States, $3.00 a year; Canada, $3.50; Foreign, $4.00. June, 1945, Vol. 57, No. 3.

HYCAR PRICES REDUCED AGAIN!

FOR the 5th time in less than 4 years we are reducing the price of Hycar. These new low prices and Hycar's proven high quality, uniformity, and versatility make it the logical material around which to build your postwar business. By so doing you can be assured of using a synthetic rubber with a demonstrated competitive future.

PRICE SCHEDULE — Effective on Shipments Beginning June 1, 1945

DRY RUBBER	*Price per lb. Std. 100-lb. Containers*	*Specific Gravity*
HYCAR OR-15	$0.45	1.00
HYCAR OR-25	0.40	0.98
HYCAR OS-10	0.40	0.98

LATEX	*Per lb. of Solids in Buyer's Tank Cars*	*Per lb. of Solids Drums—Carloads (Min. 50 Drums)*	*Per lb. of Solids Drums LCL*
HYCAR OR-15	$0.43	$0.45	$0.47
HYCAR OR-25	0.38	0.40	0.42
HYCAR OS-10	0.38	0.40	0.42

Prices are net and F. O. B. Akron, Ohio

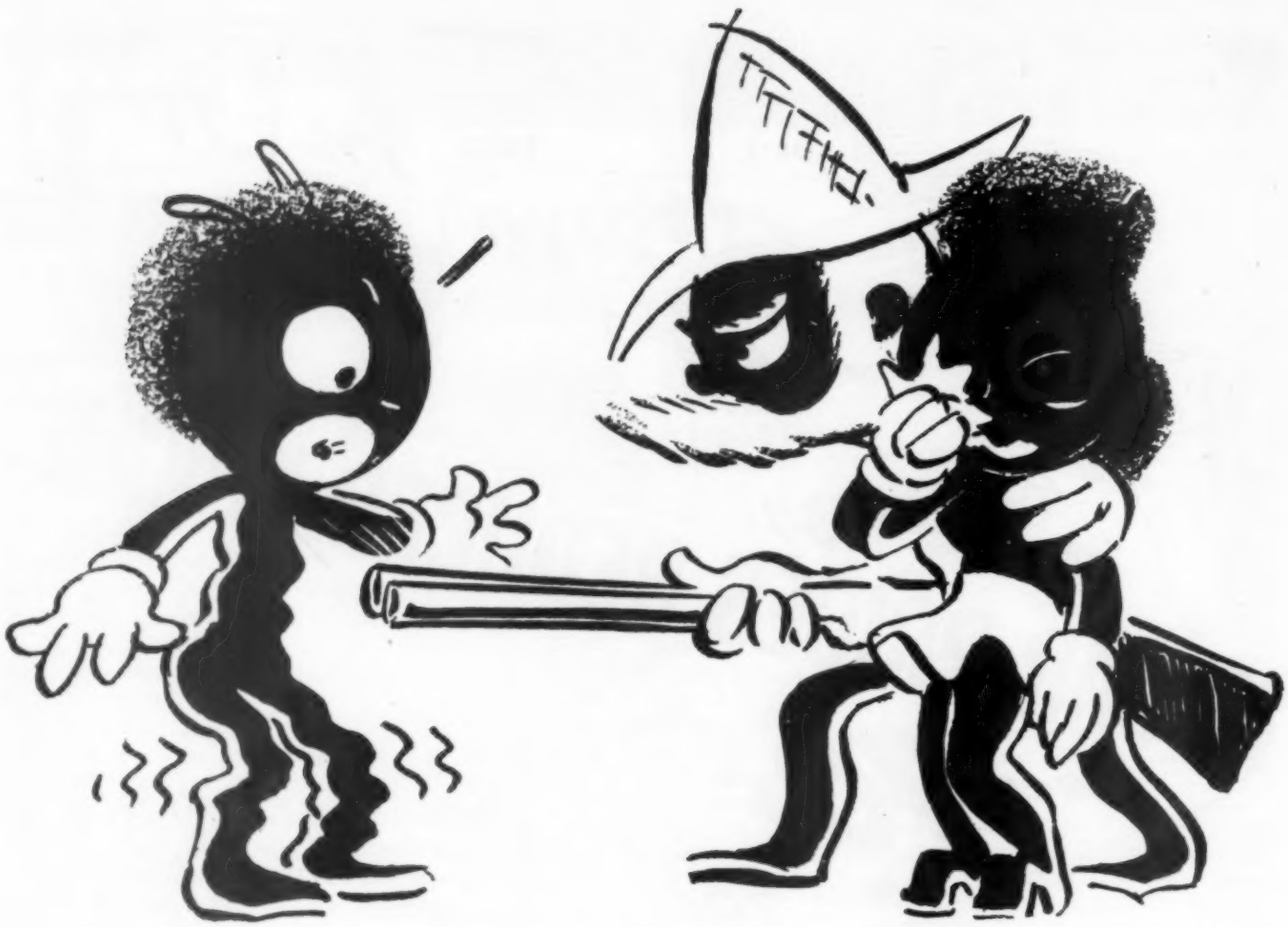
Hycar's Technical Staff is at your service, ready to help you with your individual problems. *Hycar Chemical Company, Akron 8, Ohio.*

Hycar

Reg. U. S. Pat. Off.

LARGEST PRIVATE PRODUCER OF BUTADIENE TYPE

Synthetic Rubbers



PHILBLACK A aids processing

...And How!

As in this shotgun wedding, Philblack A takes the nerve out of synthetic rubber —fast—with a minimum mixing cycle. Yes, it's really marvelous what Philblack A can accomplish in the way of easy processing, smooth extrusion, better calendering, and excellent mold flow.

This new and better black is now being used in large quantities for the manufacture of high quality tires, inner tubes, and mechanical goods. And Philblack A makes possible the maintenance of quality with the lesser loadings required because of carbon black use curtailment.

PHILLIPS PETROLEUM COMPANY

Philblack Division

FIRST CENTRAL TOWER · AKRON, OHIO

Another application that suggests interesting and important uses in all fields

THAT lovely lady probably doesn't give a hoot what the handbag is made from. But she's surely interested in the fact that it's easy to keep clean because it's waterproof and washable. She likes it because it resists scuffing and wear despite its softness. And she knows that it won't fade or turn yellow even after continued handling.

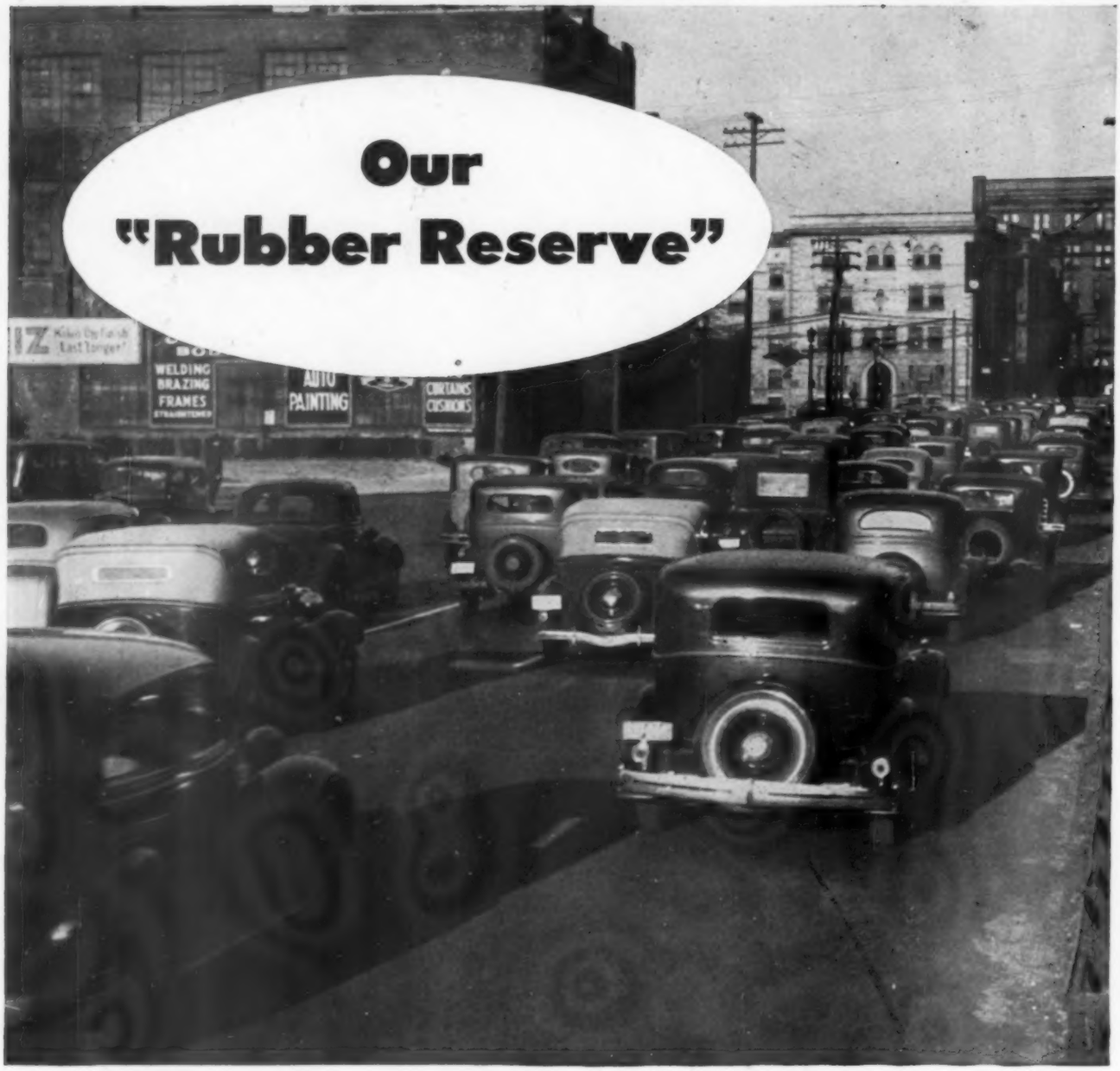
These are just a few of the properties that may be imparted to a finished product through the use of GEON polyvinyl raw materials. And they suggest many interesting and important applications.

For example, you can make scuffproof, good-looking, practically indestructible luggage and brief cases; upholstery material that can be left outdoors because it resists the aging effects of weather; water and mildew-proof fabric coatings for rainwear, shower curtains, tents; soles and heels that will outwear leather many times; film, sheet or coatings of GEON for packages that will resist wear, aging, chemicals, foods, tobacco, oils and greases, moisture, heat and cold. All products made from GEON may be brilliantly or delicately colored.

There are applications for GEON in every industry in America. For more complete information write Department KK-6, B. F. Goodrich Chemical Company, Rose Building, East 9th and Prospect, Cleveland 15, Ohio.

Geon
Polyvinyl Materials

B. F. Goodrich Chemical Company A DIVISION OF THE B. F. GOODRICH COMPANY



Our "Rubber Reserve"

Rubber men recently have been asking 2 questions. First, how long will the current supply of natural scrap rubber last? Second, what will we do when it is used up?

Philadelphia Rubber is able to come up with *three* answers to those two questions.

1. Our present stocks of natural rubber scrap for reclaim purposes will last at least through 1945—probably longer.

2. In addition, as near as we can estimate there are today 142,206,644 tires in service—either on the road or as spares—plus tremendous quantities of military tires. The large majority of these tires were made of natural rubber. As they are removed from service they will be added to the nation's supply of natural rubber scrap.

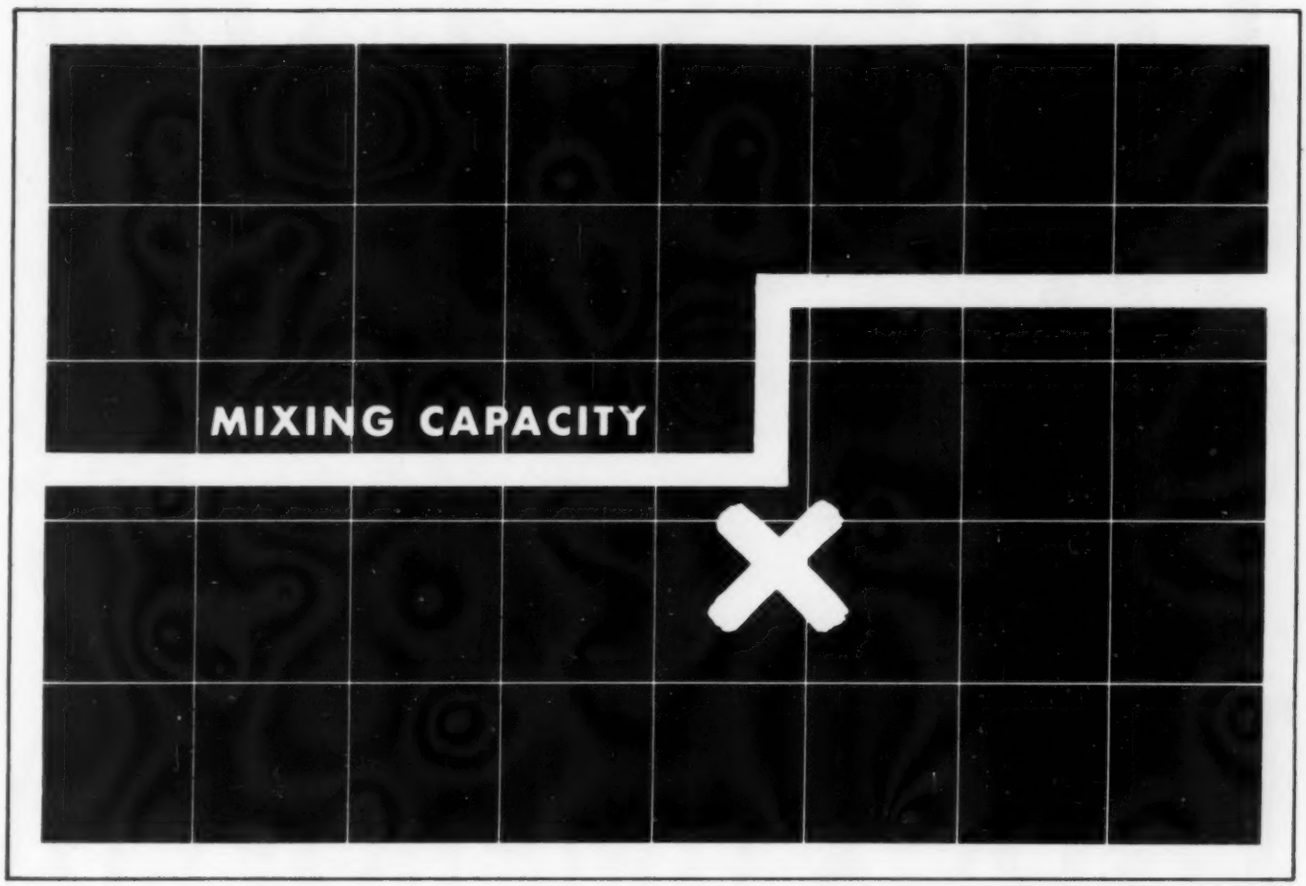
3. Philadelphia Rubber has already gained a thorough knowledge of how to reclaim synthetic rubber scrap. Our laboratory staff can work with you on solving any problems in connection with the use of synthetic reclaimed rubber.

All this should prove reassuring to users of reclaimed rubber. It should encourage you, as a user of reclaim, to continue to include it in your plans for the present and the future. *The Philadelphia Rubber Works Company, Rose Building, Cleveland 15, Ohio.*

PHILADELPHIA
RECLAIMED RUBBER

X MARKS THE SPOT . . .

WHERE NAFTEX WAS ADDED



NAFTEX is a combination of SRF or HMF black and sulfur-reactive plasticizer. Through the use of NAFTEX it may be possible to increase substantially your mixing capacity without increasing your labor or equipment requirements. Our technical representatives will be glad to discuss your particular mixing and compounding problem.

NAFTEX is relatively dustless and is in the form of dry, free-flowing pellets, with the plasticizer uniformly and completely absorbed. Thus, in addition to increased mixing capacity, NAFTEX offers the added advantages of reducing carbon black dust and eliminating the handling of viscous liquid plasticizers. Technical data and laboratory samples are available.

W
C=C

REG. U. S. PAT. OFFICE

WILMINGTON

CHEMICAL CORPORATION

10 EAST 40TH STREET • NEW YORK 16, N. Y.

There's a big difference in Dipex* (IMPROVED)

IN the molding of a wide variety of articles made of rubber and synthetic rubber and other plastic substances, DIPEX (Improved) now serves a broader range of usefulness.

Freely soluble in water, DIPEX (Improved) can be applied in dilute solution by spraying, brushing or dipping. It is particularly recommended for its anti-sticking properties.

Extremely light in color, DIPEX (Improved) can be applied to white goods molds to produce clean, sharp designs without staining.

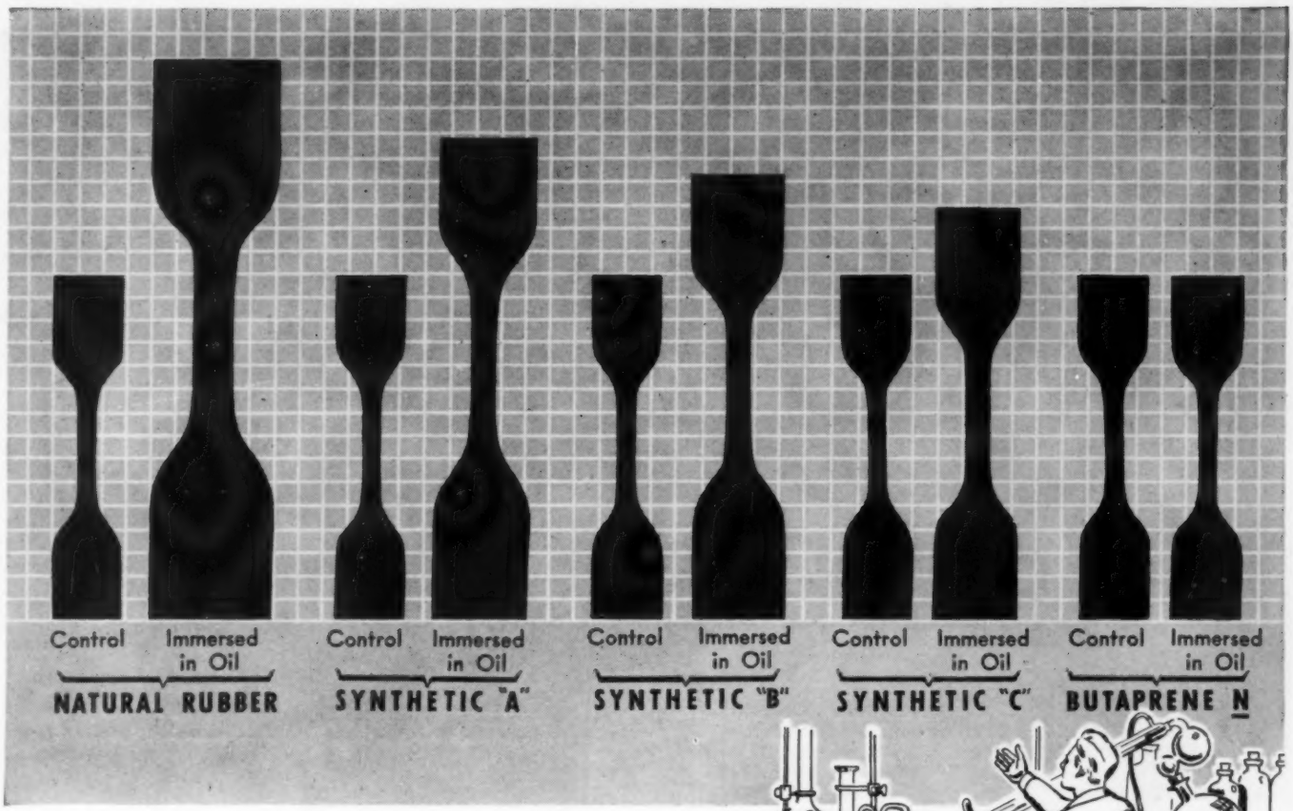
Free samples and complete technical data on request.

*Reg. U. S. Pat. Off.

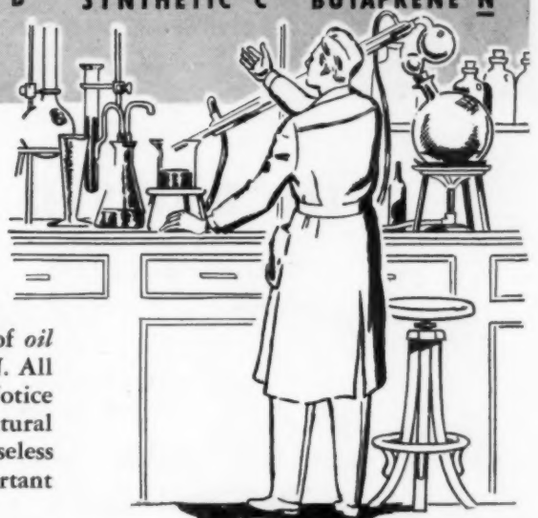
Stanco Incorporated

216 WEST 14TH STREET, NEW YORK 11, N. Y.

Copr. 1945, Stanco Incorporated



THESE DUMBBELLS ARE NOT SO DUMB!



JUST little strips of rubber! But they tell a whale of a story of *oil resistance* — one of the outstanding characteristics of Butaprene-N. All were immersed in the same oil bath for the same length of time. Notice the difference as compared with the unimmersed control strips. Natural rubber couldn't take it, soon swelled up, became a soft, sticky, useless mass. Notice, too, that synthetic rubbers vary widely in this important property. *And notice that Butaprene-N is practically unaffected.*

These Butaprene-N Synthetic Rubbers have other important properties that are finding vast new uses in industry. They function well in extreme heat or cold, wear well, resist aging, have high tensile strength. The Butaprene Technical Staff is ready to work with you on *any* problems involving the use of synthetic rubber. For complete information on Butaprene-N simply write XYLOS RUBBER COMPANY, Akron 1, Ohio.

BUTAPRENE N by Firestone

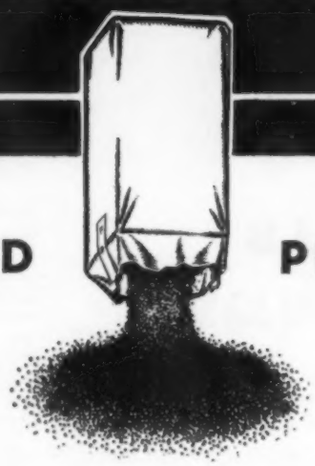
THE SYNTHETIC RUBBER OF A THOUSAND POSTWAR USES

Resists : OIL • GASOLINE • HEAT • SUB-ZERO COLD • AGING • ABRASION

Copyright, 1945, The Firestone Tire & Rubber Co.

PELLETEX and GASTEX

Semi-Reinforcing Furnace Blacks



INCREASED PRODUCTION

The uniformity of Gastex and Pelletex enables manufacturers to produce more uniform products in greater volume.

GENERAL ATLAS CARBON CO.

PELLETEX

GASTEX

MANUFACTURER

Pampa, Texas

Guymon, Okla.

HERRON BROS. and MEYER

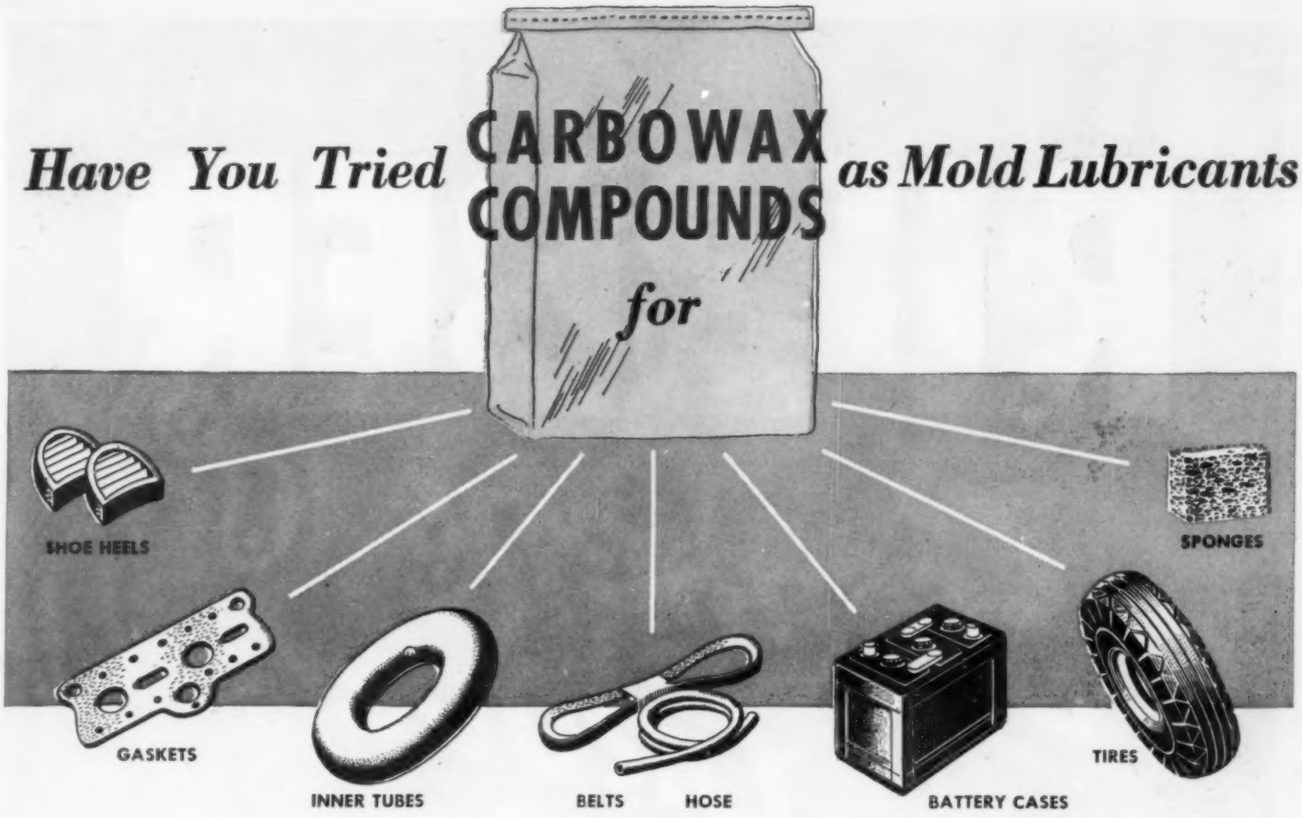
DISTRIBUTOR

New York, N. Y.

Akron, Ohio

RUBBER H AND M PIGMENTS Chemicals

Have You Tried CARBOWAX COMPOUNDS *for* *as Mold Lubricants*



Easy to Apply... Sold as dry flakes, CARBOWAX Compounds 4000 and 6000 are easily dissolved in water to make the ½ to 3 per cent solution to be sprayed or brushed on the mold.

Good Release Properties . . . The cured articles are easily removed from the molds, and have an excellent surface when these CARBOWAX Compounds are used.

Freedom From Mold Build-Up... CARBOWAX Compound solutions do not break down easily under heat. Little or no residue is left in the mold.

Less Rejects... These lubricants reduce the number of "seconds."

Solutions are Neutral... Unlike soaps, CARBOWAX solutions are non-alkaline.

Can be used with natural, GR-S, Buna N, butyl, and neoprene rubbers.

Write for Samples and Prices

OTHER USES OF CARBOWAX COMPOUNDS

1. ***To provide an anti-static coating*** for rubber belts.
2. ***To prevent adhesion*** between conveyor belts and rubber surfaces.
3. ***To activate*** mercapto-type accelerators.
4. ***To disperse pigments*** in rubber compounding.
5. ***To lubricate*** tire beads.

BUY UNITED STATES WAR BONDS AND STAMPS

SYNTHETIC ORGANIC CHEMICALS

CARBIDE AND CARBON CHEMICALS CORPORATION

Unit of Union Carbide and Carbon Corporation

UCC

30 East 42nd Street, New York 17, N. Y.

"Carbowax" is a registered trade-mark of Carbide and Carbon Chemicals Corporation.

RUBBER

Synthetic Crude Scrap

Also **HARD RUBBER DUST**
and **BALATA**

LET US SERVICE YOUR RUBBER RESERVE PERMITS

H. MUEHLSTEIN & Co. INC.

122 EAST 42nd STREET, NEW YORK, N. Y.

CHICAGO: 327 So. La Salle St. · AKRON: 250 Jewett St. · LOS ANGELES: 1431 E. 16 St. · MEMPHIS: 46 W. Virginia Ave. · BOSTON: 31 St. James Ave.

CUMATE

for

ACTIVATION WITH

CAPTAX and ALTAX

•

CUMATE when used alone is the Speed King of Acceleration.

It is also TOPS for ACTIVATING the cure when a THIAZOLE is used as the PRIMARY ACCELERATOR.

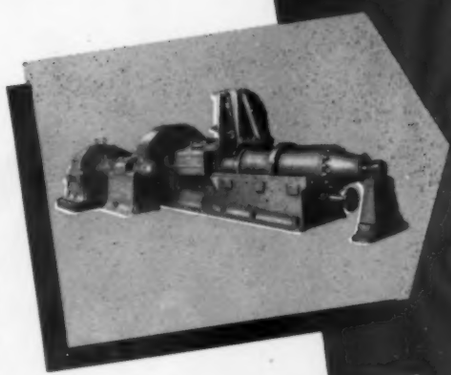
Try 1.5 ALTAX with and without 0.05 and 0.10 CUMATE on 100 GR-S and you will see why it is worth while to use CUMATE as the ACTIVATOR.

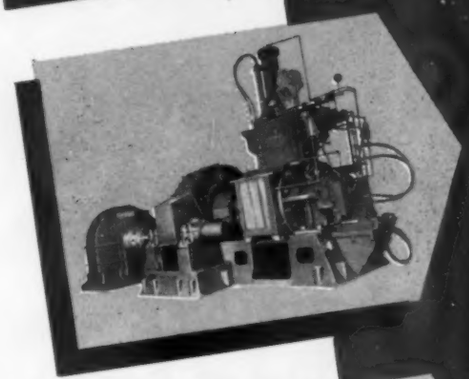
•

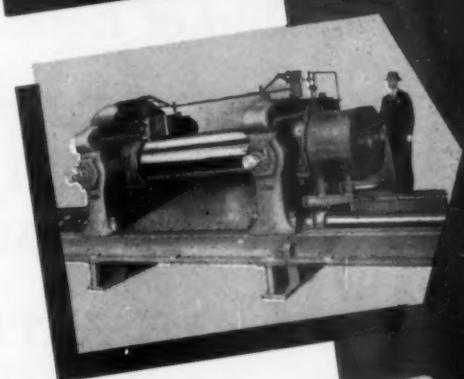
R. T. VANDERBILT CO., INC.

230 Park Avenue, New York 17, N. Y.

Filling the need FOR TIRE EXPEDITERS







Included in Farrel-Birmingham's war production schedule are orders for many scores of rubber processing machines required for the new Military Tire Program. These efficient, designed-for-the-job "expediters"—Banbury mixers, roll mills, Gordon plasticators and calenders—will enable tire producing plants to meet quotas which would otherwise be unattainable.

This is only one of Farrel-Birmingham's war jobs, for, in addition to being the largest producer of rubber processing machines in the country, the Company builds vital production equipment for the plastics, paper, metal and other war-important industries.

Also one of the leading producers of gears and gear units, Farrel-Birmingham has designed and built main propulsion and auxiliary gear drives for more than a thousand Navy and Maritime ships. In recognition of their outstanding war production records, the three plants of the Company have been awarded the Navy "E" and Maritime "M".

Farrel-Birmingham engineers are experienced in analyzing rubber processing problems and designing equipment to meet individual production requirements. This experience is available to you, without obligation.

FARREL-BIRMINGHAM COMPANY, INC., ANSONIA, CONN.

Plants: Ansonia and Derby, Conn., Buffalo, N. Y.
Sales Offices: Ansonia, Buffalo, New York, Pittsburgh, Akron, Los Angeles

F-B PRODUCTION UNITS

- Banbury Mixers
- Plasticators
- Pelletizers
- Mixing, Grinding, Warming and Sheeting Mills
- Bale Cutters
- Tubing Machines
- Refiners
- Crackers
- Washers
- Calenders
- Hose Machines
- Hydraulic Presses and other rubber working equipment

Signal Corps photo illustrating the urgent need for tire replacements on the battle fronts. Many more scores of new Farrel-Birmingham processing machines will soon be working to meet this demand in leading tire plants throughout the country.

A startling new development

by a leader in the field . . .

Polymel "6"

(Solid Easily Friable Hydrocarbon)

An outstanding Processing Resin for GR-S, Buna N, Neoprene and Reclaim Stocks. *Resists Acids, Alkali, Brine. Non-Inflammable.* High insulation resistance. Low capacitance. Low Power factor.

A TYPICAL COMPARISON IN A GR-S COMPOUND

	A	B
GR-S	100.	100.
Zinc Oxide	2.5	2.5
E.P.C.	45.	45.
Sulphur	2.	2.
Agerite Resin D	1.	1.
Santocure	1.2	1.2
Polymel No. 6	—	10.
Coal Tar Softener	10.	—

	Comp.	Mod. 300%	Mod. 500%	Tens.	Elong.	Hard.	Tear.	% Perm. Set
A	920	2160	2900	580	63	250	30	
B	1200	2540	3340	600	62	318	29	

Optimum Cure — 60 Min. @ 280° F.

GOODRICH FLEXOMETER DATA

Stroke 175 Load 175

	Cure	Hardness	Height Change	Final Temp.	Static Comp.
A	60	58	—.153	259	338
B	60	60	—.090	211	274

PRICES: Car Loads, 5½c; l.c.l., 6c; Smaller Lots, 6½c, f.o.b. Baltimore, Md.

Samples on Request

Subject to O.P.A. ceiling prices or any adjustment thereof hereafter.

The POLYMEL CORPORATION

1502 FIDELITY BUILDING, BALTIMORE 1, MD.

Piccolyte

The Versatile Synthetic Resin

Check these practical advantages

- NON-YELLOWING
- PALE COLOR
- LOW COST PER POUND
- SOLUBLE IN LOW-COST NAPHTHAS
- CHEMICALLY INERT
- THERMOPLASTIC

Write for complete details

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RUBBER INDUSTRY BY
STANDARD CHEMICAL COMPANY
AKRON, OHIO

PENNSYLVANIA INDUSTRIAL CHEMICAL CORPORATION

CLAIRTON, PENNSYLVANIA

Makers of: Coumarone Resins • Coal Tar Naphthas
Rubber Plasticizers • Reclaiming Oils • Terpene Resins

Double Trouble!

Oh, what an unbeautiful day *this* is going to be!

And it is an unbeautiful day in your plant, too, when the solvent you are using varies in uniformity. For a solvent is one of many ingredients in a formula. When uniformity varies from one batch to another—there's double trouble.

That, however, is one headache you can easily avoid. Specify SKELLYSOLVE. The SKELLYSOLVE of a given type that you order a year hence will be identical in characteristics with that type ordered today. The reason: uniformity in SKELLYSOLVE is assured by the way we refine it. Each step is directed and checked by scientific, *precision* instruments . . . instruments not subject to human error . . . that do not forget.

SKELLYSOLVE
in the
RUBBER INDUSTRY

There are six different types of Skellysolve which are especially adapted to various uses in the rubber industry, for making rubber cements, and for many different rubber fabricating operations. Skellysolve offers many advantages over benzol, rubber solvent gasoline, toluol, carbon tetrachloride, etc. It will pay you to investigate Skellysolve. Write today.

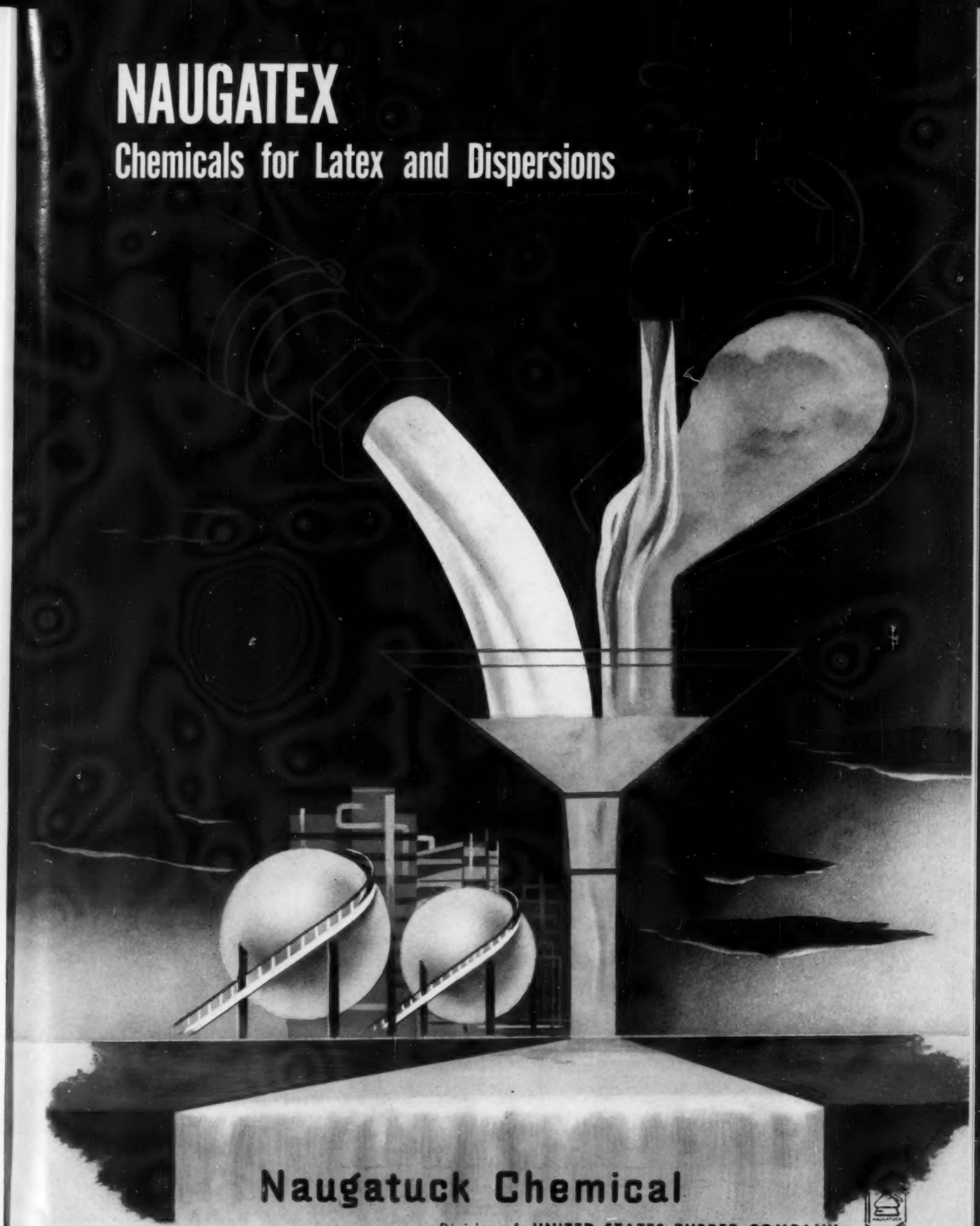
SKELLY OIL COMPANY
SKELLY
SILVER JUBILEE
1919 1944
25 YEARS OF PETROLEUM PROGRESS

SKELLYSOLVE

SOLVENTS DIVISION, SKELLY OIL CO.
SKELLY BLDG., KANSAS CITY, MO.

NAUGATEX

Chemicals for Latex and Dispersions



Naugatuck Chemical

Division of: UNITED STATES RUBBER COMPANY

1230 SIXTH AVENUE, NEW YORK 20, N. Y.

In Canada: DOMINION RUBBER COMPANY, LTD.

The "Precision" TEAR TESTER

THE ONLY METHOD
for Determining
PUNCTURE-TEAR RESISTANCE

Developed to provide puncturing conditions simulating conditions of service. Direct comparison can be drawn for such products as tires, inner tubes, conveyor belts, and hose covers. Also used to measure stitching qualities (needle resistance) of shoe sole stocks. Since it also measures a property not heretofore measured, it is a useful tool in production control, research and development work.

The apparatus is used in conjunction with the conventional Rubber Tensile Testing machine. No other additional load recordings and extension pulling apparatus is needed. The specimen is held firmly in place by the cap.

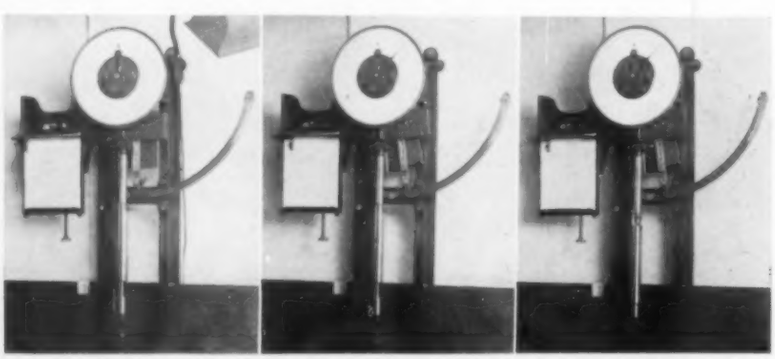
The puncturing point penetrates the test disc at the center and at right angles. Tearing preceded by the puncturing is at right angles to the surface and to the applied force. There is no irregular cross-sectional area produced to introduce a variable. This feature makes the apparatus extremely consistent and accurate.

This test is extremely rapid and can be conducted in one minute by an unskilled operator.

See your laboratory supply dealer for this and other recommended apparatus for your laboratory.

Illustration showing use in conjunction with the Scott Tensile machine.

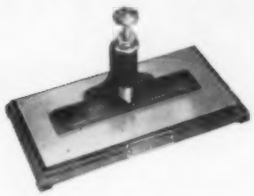
Send for new Rubber and Plastics Testing Equipment Catalog K



BEGINNING OF TEST | END OF TEST | CHANGE POSITION

See Your Laboratory Supply Dealer

A few additional items for your laboratory

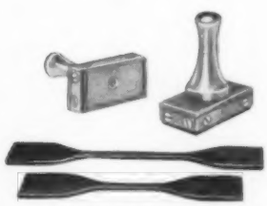


NEEDLE JIG FIXTURE

This instrument used to produce a uniform hole in the De Mattia Flexing Test specimen for cut-growth test.

SEAL AGING JIG
NAVAL RESEARCH LABORATORY RUBBER SEAL AGING TEST JIG

Used to test rubber gaskets to specification 33R9-INT. Duplicates service conditions.



GAGE MARKER

For marking elongation marks on tensile test specimen, makes both 2" and 1" marks. Fine line produces less error. Light weight —made to fit hand.

DIE BLOCK

For cutting tensile test pieces. Made from carefully selected end maple 8" square, convenient 3' height. Mounted on sponge rubber to absorb shock.

DIES

Dies of all sizes for tensile and tear test, including 2" x ½", 2" x ¼", 1" x ¼", 6" x 1" and 1.129" diameter —all to ASTM specifications.

MAULS

For dieing test samples. Durable rawhide shock proof construction.

PRECISION SCIENTIFIC COMPANY
1736-54 N. Springfield Ave., Chicago 47, U.S.A.

Engineers and Builders of Scientific Apparatus and Production Control Laboratory Equipment for a Quarter Century

"...and, Gentlemen, speaking of postwar packaging..."

COATED LITHWITE IS GOING TO PUT MORE EYE-APPEAL AND BUY-APPEAL INTO OUR CARTONS"

SIX YEARS AGO, when Gardner-Richardson introduced *Coated* Lithwite, it caused a sensation. Here for the first time was a fine paperboard—formed, made and coated in one single high-speed operation.

SALESMEN, RETAILERS, CONSUMERS give it a big okay, for *Coated* Lithwite is brighter, more eye-appealing. Colors come up with greater brilliance on its smooth, velvety, chalk-free surface. Halftones print with sharp realism.

PRODUCTION ENGINEERS also give *Coated* Lithwite folding cartons a big okay. Precision-made for precision filling machines—*Coated* Lithwite cartons speed through with fewer jam-ups or delays. Score accurately without flaking or shattering. Take a positive seal.

CLIP THIS! File this Coated Lithwite memo for reference when this quality paperboard is again available.

1. Made by a revolutionary process. Coated Lithwite is the brighter, whiter paperboard that is formed, made and coated in one high-speed operation. Proved and improved for six years.

2. Means more eye-appealing cartons. Coated Lithwite's smooth, velvety, chalk-free surface forms a better base for printing inks and plates—reproduces even the smallest type cleanly, crisply. Brings colors up brilliantly—gives halftones a sharp realism.

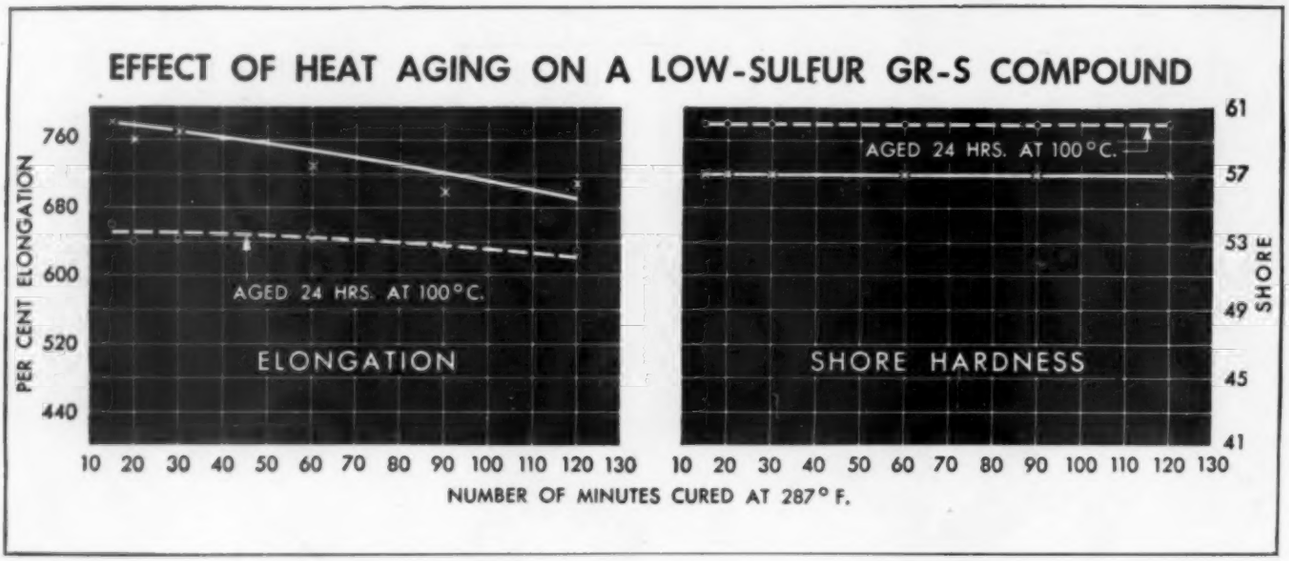
3. Fewer jammers and leakers. Coated Lithwite scores without flaking or shattering. Takes a positive, tight seal.

The Gardner-Richardson Co.

Manufacturers of Folding Cartons and Boxboard

MIDDLETOWN, OHIO

Sales Representatives in Principal Cities:- PHILADELPHIA • CLEVELAND • CHICAGO • ST. LOUIS • NEW YORK • BOSTON • PITTSBURGH • DETROIT



Physical Properties of GR-S Compounds Stay Put with New Low-Sulfur Formula

Heat resistance now made practical by

F.B.S LITHARGE

FORMULA

GR-S (Institute)	100
E.P.C. Carbon Black	40
Sulfur	0.75
Zinc Oxide	3.0
Benzothiazyl Disulfide	1.0
F.B.S. Litharge	1.5
Coaltar softener	5

Data:

Time 287° F.	*Tensile Strength*	*% Elong.*	*Modulus 300% Elong.*	*Shore Hardness*
15	2890	780	640	57
20	3010	760	660	57
30	3090	770	660	57
60	2960	730	660	57
90	2850	700	685	57
120	2960	710	700	57
	Aged 24 Hours at 100° C			
15	2970	660	980	60
20	3030	640	1020	60
30	2980	645	1000	60
60	3260	650	1040	60
90	3060	630	1130	60
120	2930	630	1040	60

OUTSTANDING CHARACTERISTICS:

The F.B.S. Litharge-thiazole combination used with low sulfur is characterized by the following:

1. Heat stability • **2.** Fast curing rate • **3.** High flat modulus **4.** Excellent general physical properties • **5.** Processing safety **6.** Efficiency • **7.** Economy.

High retention of physical properties . . . how important is that to you?

Your GR-S can have it, merely by changing to a low sulfur formula.

Now such a compound can be cured in a practical time and without extra quantities of accelerator.

F.B.S. Litharge plus benzothiazyl disulfide is what produces safe, fast cures with low sulfur content.

The curing period can be varied from 15 to 120 minutes with scarcely any effect on elongation, hardness or modulus.

Moreover, the effect of aging on samples cured for various periods is almost uniform.

Reference to the accompanying tables and charts should be convincing.

• • •

Ask us to send you a printed report, "Compounding of GR-S for Heat Resistance," issued by the Rubber Division of our Research Laboratories, which covers the subject of F.B.S. Litharge for low sulfur formulas in greater detail and from a number of additional angles. Write to

NATIONAL LEAD COMPANY

Rubber Division: 105 York Street, Brooklyn, N. Y.

New York, Buffalo, Chicago, Cincinnati, Cleveland, St. Louis, San Francisco; Boston (National-Boston Lead Co.); Pittsburgh (National Lead & Oil Co. of Penna.); Philadelphia (John T. Lewis & Bros. Co.).

The C. P. Hall Co.

CHEMICAL MANUFACTURERS

ACCELERATORS

PLASTICIZERS

ANTIOXIDANTS

A Complete Line of Approved Compounding Materials

AKRON, OHIO • LOS ANGELES, CALIF. • CHICAGO, ILL.

The Theme Song For

RUBBER RECLAIMERS TODAY!

AC-CENT-TCHU-ATE THE POSITIVE
E-lim-my-nate the negative.*

You ACCENTUATE THE POSITIVE in securing rubber scrap by dealing with The Loewenthal Co. who have been in the rubber field since 1868 and have served the rubber reclaiming industry since its inception with positive results due to expert knowledge gained through experience.

You ELIMINATE THE NEGATIVE by avoiding errors due to inexperience and carelessness, for The Loewenthal Co. always meets specifications.

THE LOEWENTHAL CO.

JACK SIDER, *President* J. K. McELLIGOTT, *Exec. Vice-Pres.*

We Solicit Your Inquiries

188 W. RANDOLPH STREET
CHICAGO 1, ILL.

159 CLEWELL STREET
AKRON 5, OHIO

Cable Address: "Gyblowell"

*From the Paramount Picture "Here Come The Waves," copyright 1944 by Edwin H. Morris & Co., Inc. Used by permission.

SHELL DUTREX 6

Plasticizer and Extender for GR—S

Chemically and physically Controlled

Direct inquiries to:

SHELL OIL COMPANY, INC.

50 WEST 50th ST., NEW YORK 20, N. Y.
(East of Rockies Territory)

100 BUSH ST., SAN FRANCISCO 6, CALIF.
(Pacific Coast Territory and Western Canada)

SHELL OIL COMPANY, LTD., 25 ADELAIDE ST., EAST TORONTO, CANADA
(Eastern Canada)

BARDOL*

What is it?

Bardol is a Barrett Rubber Compounding Material; a refined coal-tar oil which is liquid and free-flowing at 40°F.

What will it do?

It exhibits excellent performance as a softener and plasticizer especially when used with GR-S. It is a particularly fine processing agent and is highly effective in dispersing blacks.

How can it be used?

Its use in various proportions provides a variety of desirable properties. Shown below are typical Bardol recipes.

	A	B	C	D
GR-S	100.00	100.00	100.00	100.00
Bardol	0.00	10.00	20.00	30.00
EPC Black	50.00	50.00	50.00	50.00
Zinc Oxide	3.00	3.00	3.00	3.00
"Agerite" Powder	1.00	1.00	1.00	1.00
Sulfur	1.75	1.75	1.75	1.75
"Santocure"	1.20	1.20	1.20	1.20

The effects of Bardol in these recipes are demonstrated by the accompanying tests:

MOONEY PLASTICITY
(3 min. shear at 100°C)

Bardol Content	0	10	20	30
	90	66	52	46

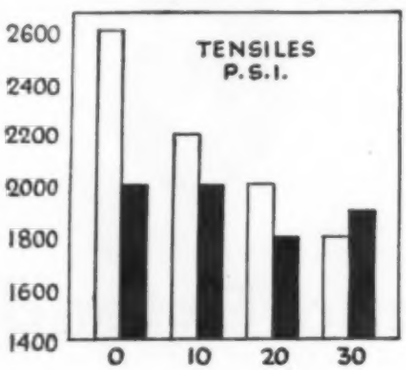
Note: In the accompanying charts the difference between aged and unaged stocks is represented by:

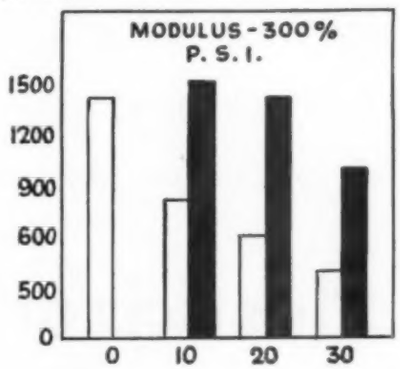
Unaged

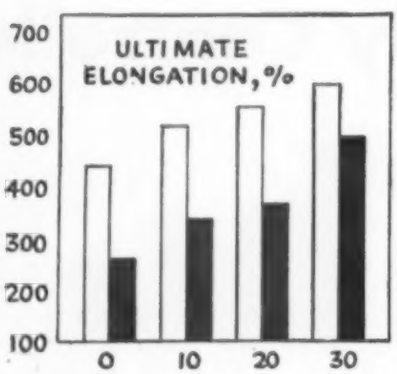
48 hrs.: 100°C

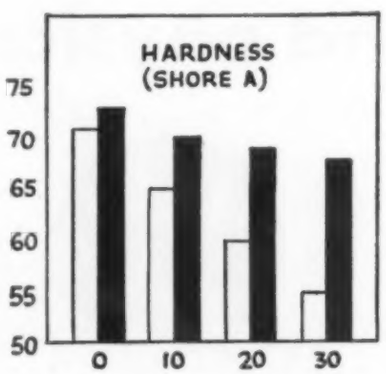
ALL CURES

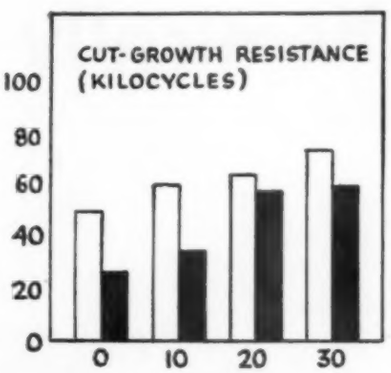
60 min. at 281°F (35 lbs.)











THE BARRETT DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 Rector Street, New York 6, N. Y.
In Canada: The Barrett Company, Ltd., 5551 St. Hubert Street, Montreal, Que.

Barrett

*Trade-mark Reg. U. S. Pat. Off.

BUNATAK-U

REG. U. S. PAT. OFFICE

The PLASTICIZER for GR-S Coated Fabrics

Produces EXCELLENT ADHESION of Calendered GR-S Coatings to Fabric . . . .

BUNATAK-U is an excellent plasticizer for GR-S compounds for coated fabrics. When used in prime or anchor coat compounds it imparts exceptional adhesion to fabric.

The cement compound using this material runs with a smooth rolling bank in front of the coating knife.

BUNATAK-U does not retard the cure of a spreader compound as do many other type plasticizers. In calender coating compounds for fabrics, it imparts good plasticizing action on the GR-S without softening the compound. The compound mills and calenders much the same as natural rubber coating compounds.

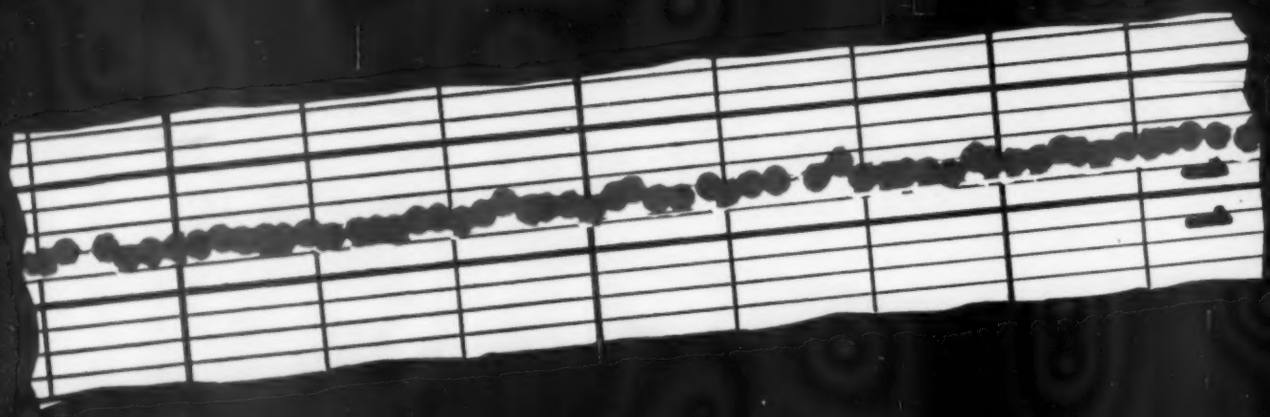
BUNATAK-U does not make a soft mushy stock as do many ordinary oil plasticizers. It produces a firm stock with good uncured strength, which is most important in the handling of proofed fabrics in the uncured state. This is especially true when fabricating items from uncured compounds such as Raincoats, Baby Pants, Dress Shields, Hospital Sheeting, Shower Bath Curtains and similar articles.

BUNATAK-U
is a light brown viscous liquid with a specific gravity of .987 which flows freely at room temperatures.

If you have not yet profited by the use of BUNATAK-U . . . *Send for a sample and suggested compounds.*

BUNATAK CHEMICAL COMPANY

74 Florence Street

MALDEN, MASS.

Baker's Controlled Temperature* supplies what NEOPRENE COMPOUNDERS demand

a CALCINED MAGNESIA that is always UNIFORM

7 BAKER CHEMICALS for the rubber industry

MAGNESIUM OXIDE
MAGNESIUM CARBONATE
CALCIUM NITRATE
LEAD ACETATE
LEAD PEROXIDE
CARBON DISULFIDE
CARBON TETRACHLORIDE

NOTE THE temperature chart above!* The temperature recording of the electric ovens never varies more than 5%. Temperature control and uniform physical characteristics—both are important factors in supplying light Calcined Magnesia of satisfactory quality to Neoprene Compounders.

Baker's Magnesium Oxide (Neoprene grade) is easy to incorporate. It is uniformly good in wetting power and dispersion. It provides improved stability of the compounded stock.

These are qualities Neoprene Compounders *must* have in a Calcined Magnesia. They are qualities you *get* in Baker's Light Calcined Magnesia. Baker, in many years of producing purity products to definite physical and chemical specifications, has learned the art of *exactness* and of manufacturing to small tolerances.

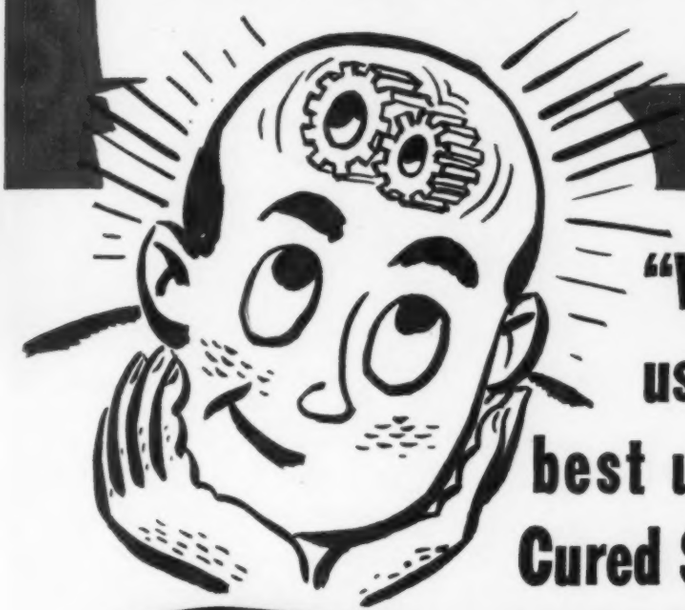
Investigate Baker's Light Calcined Magnesia. Learn why it is better. Send for free samples.

J. T. Baker Chemical Co., *Executive Offices and Plant:* Phillipsburg, New Jersey. *Branch Offices:* New York, Philadelphia and Chicago.

Baker's Light CALCINED MAGNESIA

(MAGNESIUM OXIDE)

American brains have solved every war-time problem... THEY WILL SOLVE THIS ONE TOO!



"We Invite You to help us find out how to best utilize or process Cured Synthetic Rubber Scrap"

$1000.00 IN CASH PRIZES

Facts About This Big Contest

A group of rubber technologists identified with the rubber industry, known as the Chicago Rubber Group, is offering three prizes, totaling $1000.00 for the best papers on the utilization (reclaiming and processing) of cured synthetic rubber scrap. While the papers may deal with any phase of the problem, here are some subjects which suggest themselves: 1. Separation and segregation of synthetic scrap rubber. 2. Methods of identification of synthetic scrap rubber. 3. Reclaiming of synthetic scrap rubber. 4. Compounding studies which will result in greater use of reclaimed synthetic scrap, or of ground synthetic scrap rubber.

First prize: $500.00; second prize: $300.00; third prize: $200.00. If you feel that you have ideas of value for this contest, be sure to enter! You may win one of these substantial cash prizes.

READ THESE SIMPLE CONTEST RULES:

This contest is open to anyone in the United States or Canada excepting officers and directors of the Chicago Rubber Group for 1943-1945. Selection of subject matter is left to the discretion of the contestant. As many papers as desired may be submitted by any one contestant. Papers should be based upon information which has not previously been presented before any technical society meeting or published in any trade magazine. Contest closes at midnight on August 1, 1945. Awards will be made during the fall meeting of the American Chemical Society in Chicago, 1945. The decision of the judges will be final. Each author must submit three copies of his paper to Mr. A. R. Floreen, Vice-President, City National Bank & Trust Company, 208 S. La Salle St., Chicago. These three copies will be judged separately by the Rubber Manufacturers Association, the Rubber Reclaimers Association and the Rubber Division of the American Chemical Society. The judges will report their findings to Bruce W. Hubbard, Chairman, Chicago Rubber Group, 2512 W. 24th Street, Chicago, to whom all inquiries for additional information should be addressed.

Sponsored by CHICAGO RUBBER GROUP, Chicago

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for **INSULATED WIRE**

Tensile Strength

Resistance to aging

Dielectric strength

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QUALITY CHEMICALS
FOR THE NEW SYNTHETIC RUBBERS

SELECT YOUR RUBBER CHEMICALS
FROM THESE GENERAL CHEMICAL PRODUCTS:

BASIC CHEMICALS
GENERAL CHEMICAL COMPANY
FOR AMERICAN INDUSTRY

Sulfuric Acid: All grades and strengths.

Aluminum Sulfate: To precipitate polymerized synthetic rubbers.

Fluosulfonic Acid: For production of Boron Trifluoride.

Potassium Cyanide—Sodium Cyanide: In production of acrylonitrile rubbers.

Copper Fluoborate—Zinc Fluoborate—Copper Cyanide—Sodium Cyanide: Intermediates for "plating" rubber to metals.

Lead Fluoborate: For lead plating in battery manufacture.

Sulfur: Commercial Rubbermakers' and other grades.

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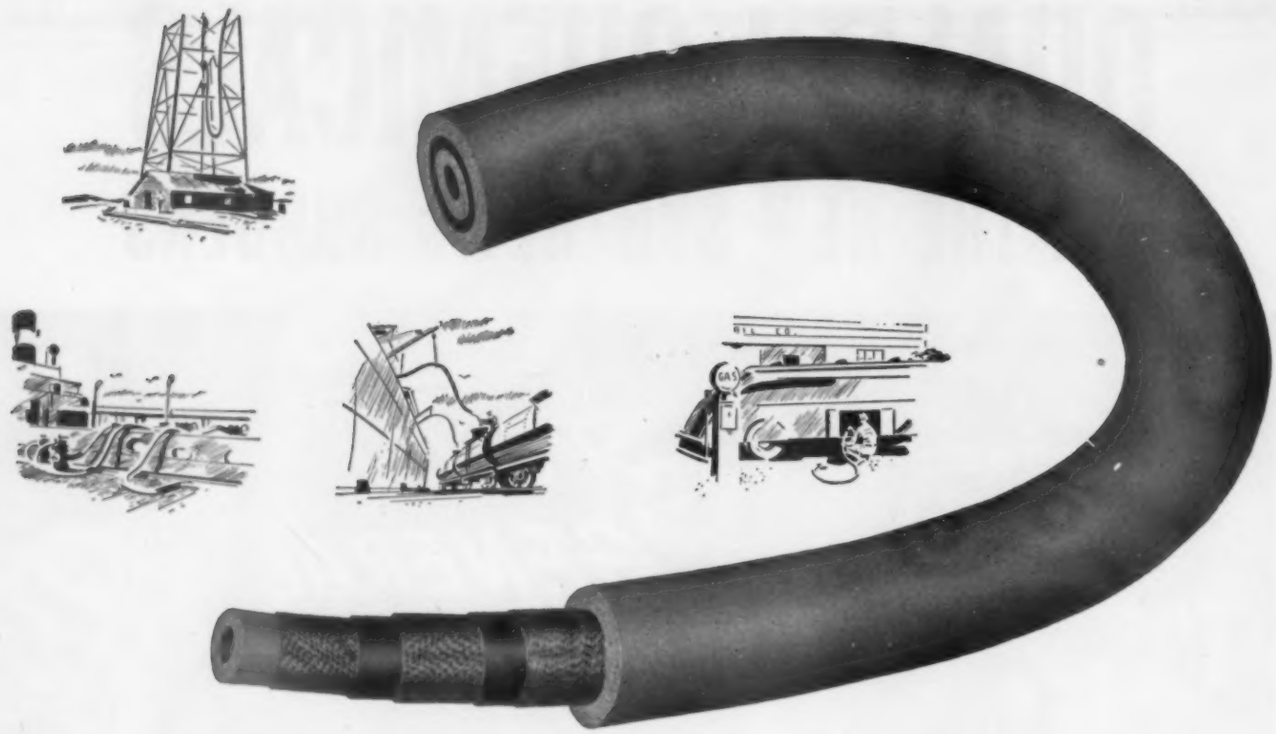

BACKBONE...
For a High Pressure Hose

OIL well rotary drilling hose has to take pressures up to 5,000 pounds, stand up under constant flexing and re-flexing, carry heavy volumes of fast-flowing mud to lubricate the drilling. It takes plenty of *backbone* to hold up under that kind of strain, and so in this hose, as in many other types, the backbone is steel wire.

Only the highest quality steel *wire* can provide the necessary reinforcement for strength and long life . . . its use in fabricated form helps provide the highest degree of flexibility necessary for this rugged service.

That's why most leading hose manufacturers have consistently specified braided *steel wire* especially developed with essential characteristics for hose reinforcement.

Developing and producing that kind of wire has been National-Standard's main job since the early days of the rubber industry. Close cooperation between rubber engineers and National-Standard wire experts has resulted in uniform high quality wire for many types of hose, brought forth time-saving, cost-reducing machinery for the application of wire into finished products, and has lead to many *new* uses for wire with rubber. Tires, airplane de-icers, conveyor belts, V-belts, and tubing are only the beginning of even greater wire-and-rubber developments to come.

If you have plans for product improvement or development, let National-Standard's experience help with a type of wire and method of application specifically fitted to your product.

BUY AND KEEP WAR BONDS

NS
NATIONAL-STANDARD Company
NILES, MICHIGAN

Divisions of National-Standard Company

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Niles, Mich.
TIRE WIRE, FABRICATED BRAIDS AND TAPE

ATHENIA STEEL
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COLD ROLLED, HIGH-CARBON SPRING STEEL

WAGNER LITHO MACHINERY
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LITHOGRAPHING AND SPECIAL MACHINERY

WORCESTER WIRE WORKS
Worcester, Mass.
ROUND STEEL WIRE, SMALL SIZES

TRITON R-100

The most widely used Dispersing Agent for the Latex Compounding of GR-S

TRITON R-100 makes it possible to introduce carbon black into synthetic rubber latex, a revolutionary feature which permits maximum production with existing milling equipment. Moreover, the carbon black dispersion formed with this efficient dispersing agent exhibits unusually low viscosity, permits easy handling, and eliminates mechanical difficulties. These features of TRITON R-100 have greatly simplified the GR-S latex compounding process, reducing by one-third the time required for the incorporation of carbon black into synthetic rubber.

TRITON R-100 does not interfere with normal procedure of latex coagulation, and the completed stock is in every way equal to synthetic rubber in which the carbon black has been added by dry milling.

The cost of TRITON R-100 is surprisingly low. It is an economical as well as an efficient dispersing agent for *all types* of carbon black, zinc oxide, and a variety of other solids. Write for detailed information today.

TRITON *is a trade-mark, Reg. U. S. Pat. Off.*

Represented by Cía. Rohm y Haas, Carlos Pellegrini 331, Buenos Aires, Argentina, and agents in principal South American cities.

THE RUBBER CHEMICALS DEPARTMENT

ROHM & HAAS COMPANY

WASHINGTON SQUARE, PHILADELPHIA 5, PA.

Manufacturers of Chemicals for the Rubber, Textile, Leather, Enamelware and other Industries . . . Plastics . . . Synthetic Insecticides . . . Fungicides . . . Enzymes

Available Now!

NOVAC

(Selenium dibutyl dithiocarbamate)
Liquid

NOVAC A-13

1 Part Novac
(3 parts benzothiazyl disulfide)
Dustless Powder

Non-Dusting
Improved Dispersion
Good Aging

RUBBER
H AND M
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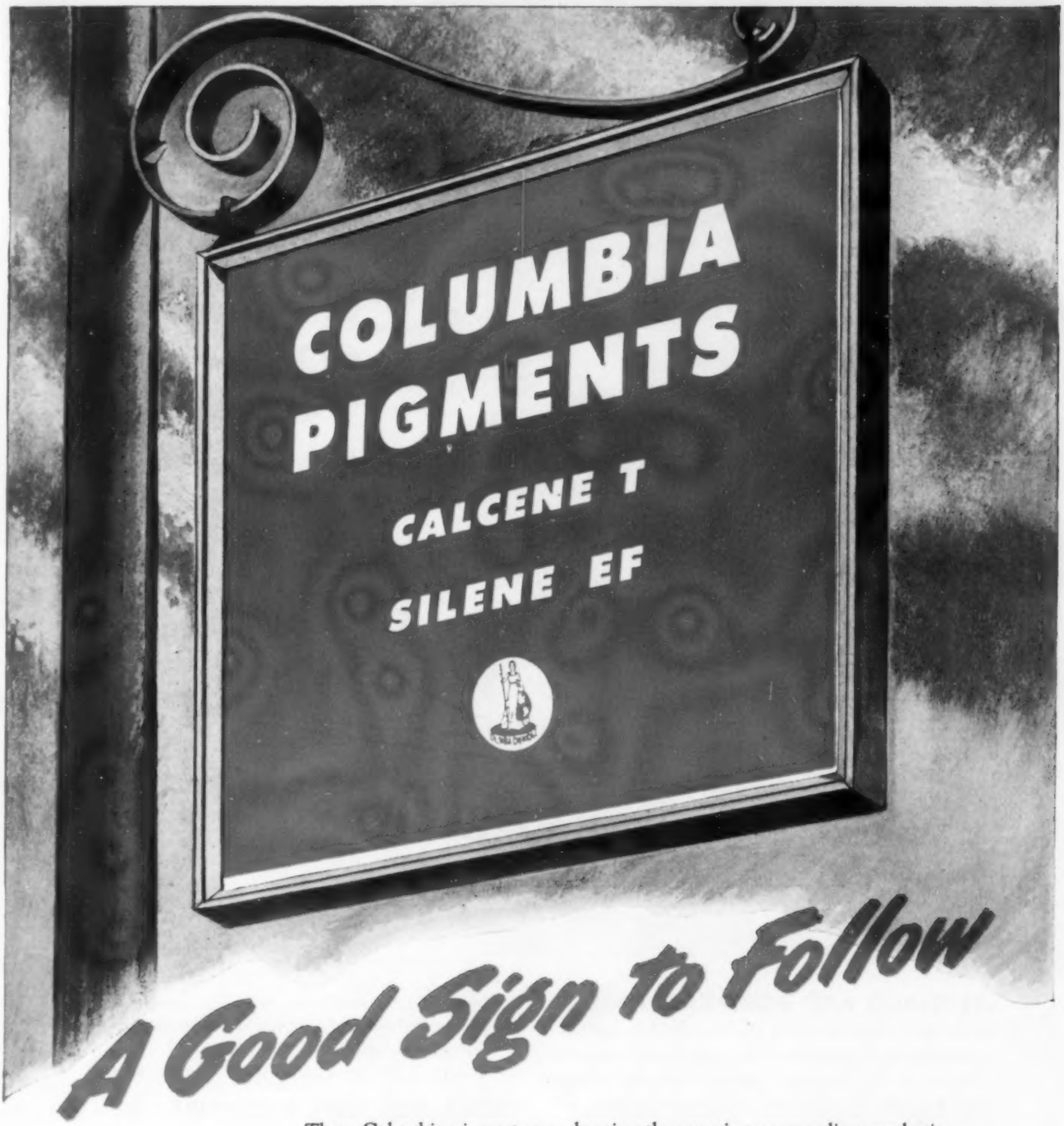
516 OHIO BUILDING, AKRON, OHIO
SUPPLIERS OF RUBBER CHEMICALS



A Good Sign to Follow

These Columbia pigments are showing the way in compounding synthetic rubbers requiring resistance to tear and abrasion, tensile strength, various degrees of hardness, and other desirable properties. Data on Calcene T and Silene EF will be furnished on request.

COLUMBIA CHEMICALS

PITTSBURGH PLATE GLASS COMPANY
COLUMBIA CHEMICAL DIVISION
GRANT BUILDING · PITTSBURGH 19, PA.

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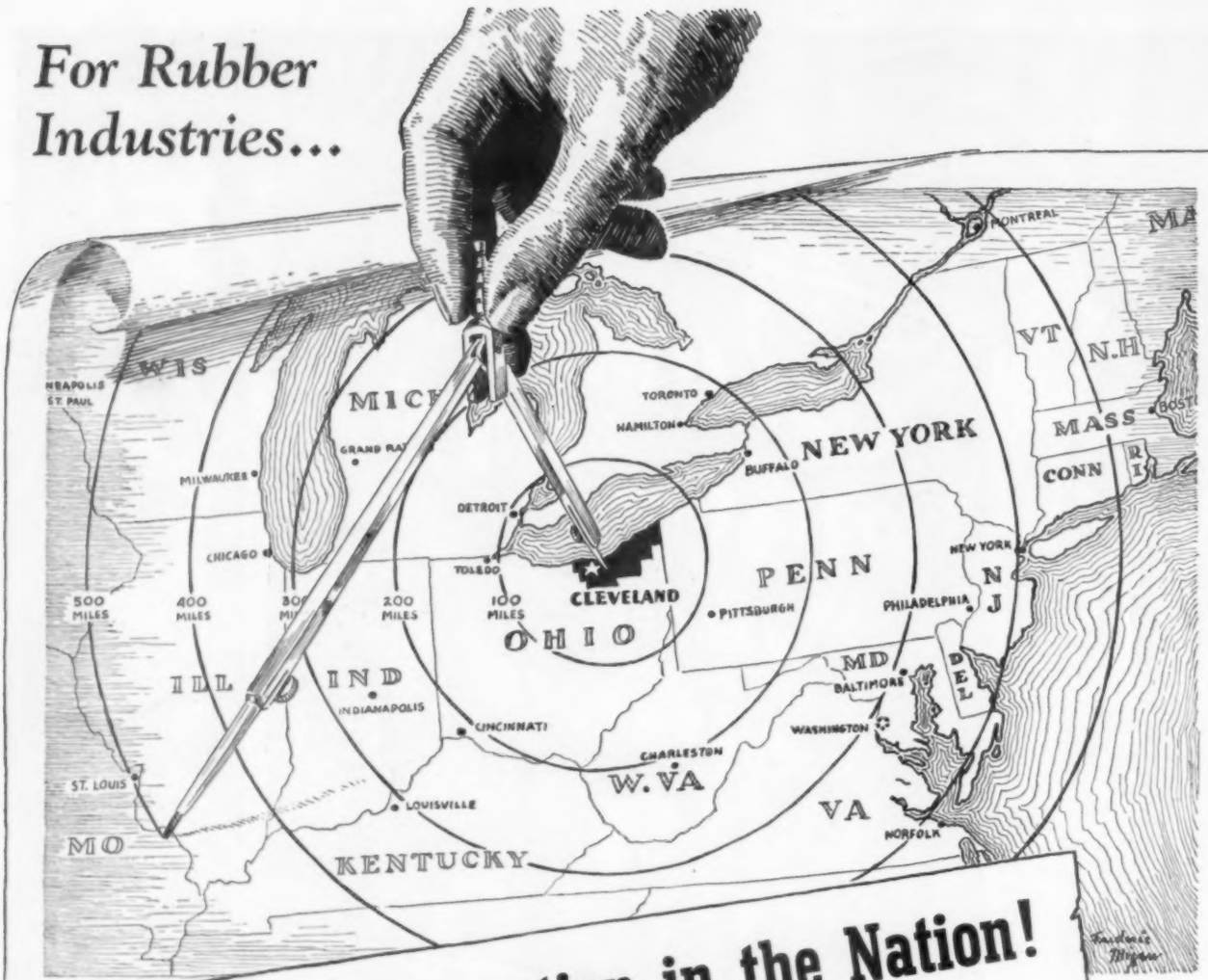
For Rubber Industries...



The Best Location in the Nation!

CLEVELAND AND NORTHEAST OHIO is by far the best place in the nation for rubber industries to expand, or to build new plants.

Here, at the world's rubber manufacturing center, you will find a unique combination of essentials to successful production and distribution. Among the more important are:

—central location in respect to major markets
—ideal center for management
—superlative transportation by land, water and air
—adequate electric power at low rates
—unlimited fresh water supply
—plenty of manpower with the know-how
—many producers of parts, materials and supplies
—ample financial services
—numerous business and industrial services
—favorable tax structure—no state income tax
—diversified industries to supply and to be supplied
—desirable plants and plant sites
—excellent living and cultural environment

SEND FOR NEW BROCHURE. We tell more about Cleveland and Northeast Ohio's many superior industrial assets in an up-to-the-minute brochure, "The Best Location in the Nation for Many Industries". We will be glad to send you a copy upon request.

USE THIS SERVICE. We are prepared to provide our confidential *location engineering service* without charge to managements of companies who are considering expansion.

Call, write or wire Industrial Development Division, R. C. Hienton, Director

THE CLEVELAND ELECTRIC ILLUMINATING COMPANY
79 PUBLIC SQUARE • CHerry 4200 • CLEVELAND 1, OHIO

Message to an executive with rubber products to sell

JOHNSON'S RUBBER FINISHES add extra "eye" and "buy" appeal!

Now your new rubber products can be given extra "eye" and "buy" appeal . . . shielded from "shopwear" during production and while on display . . . guarded against scuffs and bumps in transit. Made more impervious to dirt and finger marks, less vulnerable to oxidation and sun-checking, your goods become more salable.

Reason for all these benefits to rubber is Johnson's Rubber Finishes. Secret of their beautifying and protecting powers is wax. Johnson laboratories have made wax the basic ingredient in these finishes that "dress up" a product—give it a lustrous beauty and protection.

Johnson's Rubber Finishes are available in clear and black. They may be easily and economically applied by spraying, dipping, brushing or wiping. Drying time is short. They resist cracking and scaling, are non-flammable.

Johnson's Rubber Finishes *can* give *your* product the "plus" it needs to be a sales leader. For information, fill out and mail the coupon today!

JOHNSON'S RUBBER FINISHES

Made by the makers of Johnson's Wax

S. C. JOHNSON & SON, INC., Racine, Wisconsin

Keep buying more EXTRA War Bonds!

S. C. JOHNSON & SON, INC.
Dept. RA-65 Product Finishes Dept., Racine, Wis.

Gentlemen: Yes, I would like to know how Johnson's Rubber Finishes will help sell my products. Please send the "Special Waxes for Industry" brochure.

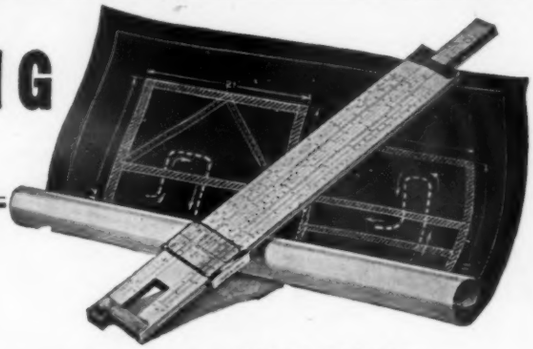
Name_____ Title_____

Address_____

Company_____

Product_____

OVEN ENGINEERING NEWS



IOE Box Ovens Bring High Speed And Top Efficiency To Both Experimental And Production Work

Many rubber and synthetic processing jobs, particularly in laboratories and pilot plants, do not require elaborate handling, conveying and heating equipment, and for such applications the Industrial Oven Engineering Company designs and manufactures a complete line of box-type ovens.

Furnished for any kind of commercial fuel, the ovens shown on this page have given their users considerable advantages of speed, cost and quality in their finished products. While each oven is custom built to assure maximum efficiency for the user's needs, all are made according to standardized designs which result in improved structural qualities.

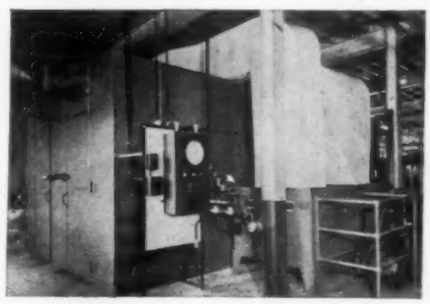
This low-temperature curing oven for mechanical rubber parts is shipped assembled, ready for operation after attachment of accessories and connection to its heat source. It has a built-in, high-pressure air heater for positive and rapid circulation through a dense work load.

Above: A standard unit for polymerization of laminated synthetic materials, providing temperatures up to 900° for the thermo-setting of flexible organic resins. In one application it reduced polymerizing time for a given load from 18 to 9 hours without temperature increase. However, extra temperature capacity allows high boiling point solvents to be readily processed and high temperature resins to be used as easily as conventional impregnants.

Below: A preheating oven for rubber sheets. This unit handles a total load of 3000 pounds, carried on two trucks weighing 500 pounds each. With such a load on the basis of a short cycle heat, fuel costs average only 14 cents per hour.

Paint Finishes Baked Faster

Tests conducted on regular production runs of paint finishes baked on hard rubber parts show that **IOE** box ovens have cut baking time up to 15 per cent, at the same time producing decidedly superior surfaces. Like every other **IOE** installation, the oven shown below is equipped with a large-volume convection air heater and complete temperature, safety and ignition controls.



SIX IMPORTANT POINTS

1. Standard sizes and designs.
2. Wide temperature ranges.
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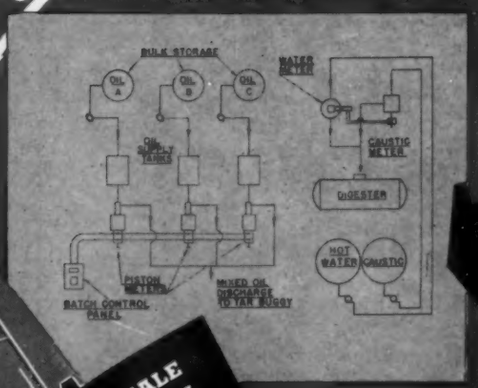
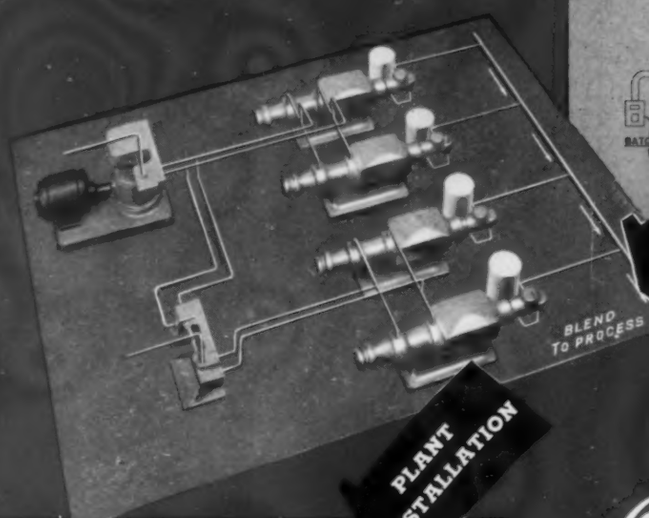
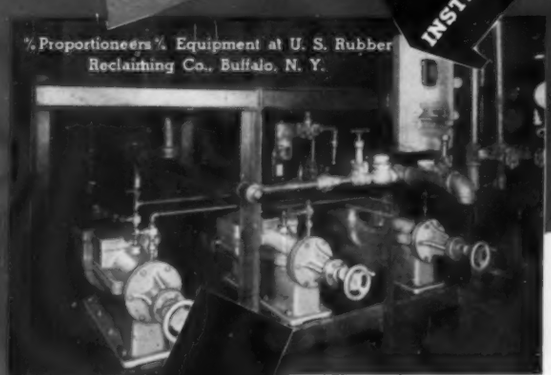


FLOW DIAGRAM



SCALE MODEL

PLANT INSTALLATION



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Perbunan	100.0
Zinc Oxide	5.0
Stearic Acid	1.0
Benzothiazyl disulfide	1.0
Sulfur	1.5
S.R.F. Black	25.0
F.T. Black	25.0
Tributoxyethyl phosphate	15.0
Plasticizer SC*	15.0
Protective Wax**	2.0

PHYSICAL PROPERTIES

Original Sample—Cured 45' @ 287°F	
Shore Hardness	38
Tensile psi	1600
Elongation, %	670
% Compression Set, ASTM Method B, 70 hrs. @ 212°F	
40% Deflection	66
Oven Aging, 70 hrs. @ 212°F	
% Change, Tensile	+15
% Change, Elongation	−22
Points Shore Change	+ 9
180° Bend Test	O.K.
Immersion for 70 hrs. @ Room Temperature in ASTM Test Oil #3 Aniline Point 158°F	
% Change, Tensile	+ 9
% Change, Elongation	+15
Points Shore Change	+ 5
% Change, Volume	− 3
SAE—ASTM Low Temperature Bend Test, 5 hrs. @ −70°F	O.K.

* Diisobutyl Azelate may be used.
** Sun Proof, Heliozone, Antisol.

This compound can be used wherever it is necessary to have good oil resistance and excellent flexibility at low temperature.

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Technical Bulletin No. 11

on the Compounding of GR-S with Substantial Loadings of Zinc Oxide

100 Parts of Zinc Oxide with GR-S-10 (Rosin Soap Polymer)

Benzothiazyldisulfide Acceleration

(Refer to Technical Bulletins No. 9 and No. 10)

CONTINUING the study of Zinc Oxide performance in the rosin soap polymer, benzothiazyldisulfide has been found to give quite satisfactory stress-strain properties and improved tear resistance, both at room temperature and 100°C. Possibly, a compound with lower permanent set at break and better rebound and heat generating properties could be obtained by increasing the sulfur content to 3.5, without seriously impairing the cut-growth resistance. Reduced coumarone-indene resin and ELC magnesia still appear to be desirable additions to the compound.

COMPOUND No. 11

GR-S-10	100.0
Sulfur	3.0
Benzothiazyl-disulfide	2.0
ELC Magnesia	5.0
Coumarone-indene resin	3.0
Zinc Oxide	100.0

ORIGINAL RESULTS

Time of Cure Min. at 45 Lb.	Tensile Strength (psi)	Per Cent Elongation	Modulus Load (psi) for Elongation of				Permanent Set
			200%	300%	400%	500%	
7.5	250	1040	35	70	110	145	.51
15	1950	760	225	335	410	635	.19
30	1630	650	235	310	465	740	.16
45	1735	610	265	415	680	980	.19
60	1285	580	265	415	605	940	.11
90	1755	630	260	375	560	860	.14

Time of Cure Min. at 45 Lb.	Shore Hardness	Goodyear-Healey Pendulum		Compression Fatigue (Goodrich Flexometer)*					Cut-Growth Resistance Inches Failure at	
		Indentation in mm.	Per Cent Rebound	Per Cent Initial Comp.	Running Time and Per Cent Permanent Set	Max. Temp. Rise °C.	Dynamic Compression		15,000 Cyc.	48,000 Cyc.
							Initial	Final		
90	45	8.15	54.8	23.1	15'-2.7	17.5	14.3	15.4	.19	.85

*Test Conditions: 100 Lb. Load. 0.15" Stroke. 100°C. Oven Temp.

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AERO AC 50—Delayed action activator for the thiazole type of accelerators.**

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THE SHADOW WILL PASS...

THE SHADOW cast by war on white rubber goods will pass . . . and it is reassuring to know that TITANOX pigments then will be ready to play their all-important part in the brighter picture of the future.

TITANOX pigmented white side-wall tires again will grace the nation's motor cars, continuing their demonstration of ability to stand up under severe usage . . . sparkling white rubber goods again will provide eye-appeal for the buying public.

Against that day, conscious of its obligation to the industry, the efforts of the Rubber Service Staff at the TITANOX Laboratories are, as always, dedicated to improvement in the technique of white rubber compounding.

For the present may we reiterate: In GR-S as in natural rubber TITANOX pigments provide the greatest possible whitening effect.

We invite technical inquiry

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A completely satisfactory synthetic adhesive for flocking has long been a major problem to rubber chemists and manufacturers. We believe our new synthetic latex base compounds will overcome all of the previous difficulties no matter what method of application is used: — spraying, spreading or doctoring.

Adaptable to both cotton and rayon flock, these compounds are also non-inflammable, water-resistant, and can be pigmented to match the color of the flock or base material. A further advantage is the elimination of any additional extending, mixing, or dilution at your plant: — This General Latex compound is shipped in the form of an aqueous dispersion *ready for use.*

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These compounds are not carried in stock but can be supplied on short notice, tailor-made to your individual requirements. For a thorough analysis of any heat sealing problem you may have, we suggest that you get in touch with our laboratory.

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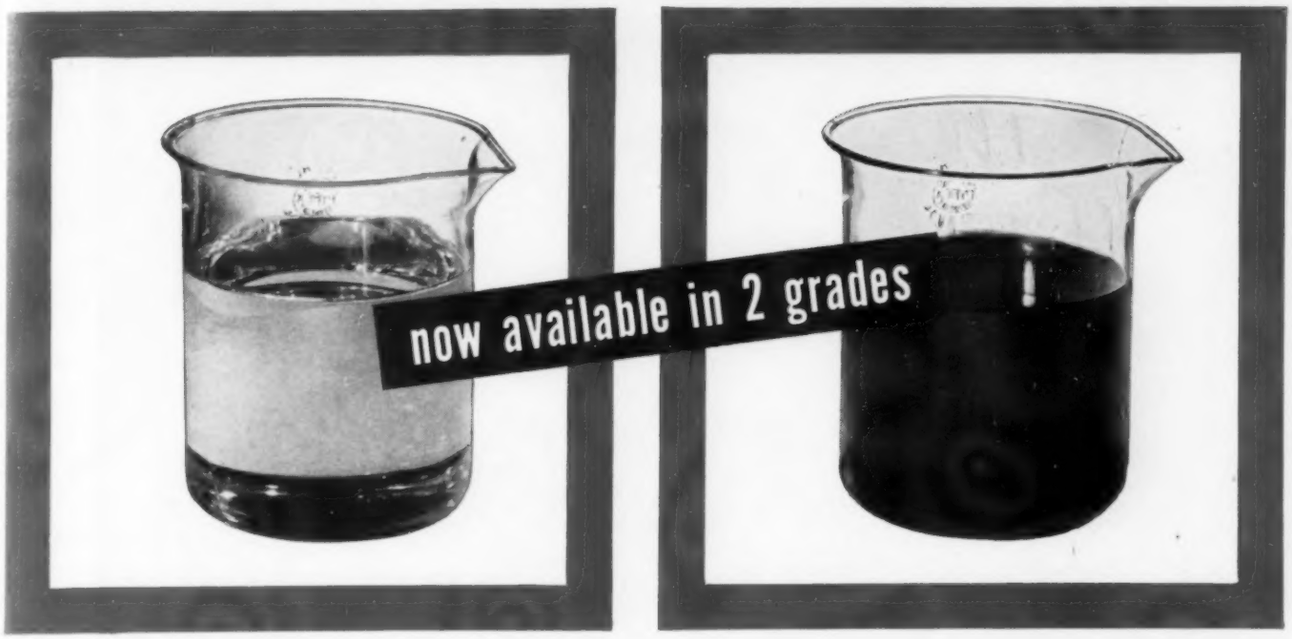
ORTHO-NITRODIPHENYL VERSATILE PLASTICIZER



Monsanto Ortho-Nitrodiphenyl now is available in two grades — technical and refined. Both are excellent plasticizers with a wide range of uses. One is just as effective as the other, but the refined grade is preferable where color is important in the finished product. The technical grade costs only 6 cents a pound in carlots. The refined grade is 10 cents a pound in carlots. Both prices are f.o.b. St. Louis.

As a plasticizer, ortho-nitrodiphenyl can be used alone or in conjunction with other plasticizers. It is applicable to the entire range of synthetic resins from the cellulose esters and ethers through the vinyls and vinyl copolymers. It is compatible with alkyds and some synthetic rubbers.

Complete data and samples will be sent promptly upon request. You may use the convenient coupon below, contact the nearest Monsanto office or write: MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1700 South Second Street, St. Louis 4, Missouri. District Offices: New York, Chicago, Boston, Detroit, Charlotte, Birmingham, Los Angeles, San Francisco, Seattle, Montreal, Toronto.

CHEMICAL AND PHYSICAL PROPERTIES OF MONSANTO ORTHO-NITRODIPHENYL

The figures included are approximately correct and can be considered as average values for regular production of ortho-nitrodiphenyl, Technical.

MELTING POINT	35°C.
BOILING POINT AT 10 MM.	172°C.
BOILING POINT AT 760 MM.	320–330°C.
REFRACTIVE INDEX AT 25°C.	1.6128
SPECIFIC GRAVITY AT 40°/15.5°C.	1.189
SPECIFIC GRAVITY TEMPERATURE COEFFICIENT	0.00083/°C. (33°–80°C.)
VISCOSITY AT 25°C. AT 45°C.	38 Centipoises 12 Centipoises
FLASH POINT	143°C. (289.5°F.)
FLASH POINT	179°C. (354.5°F.)

SOLUBILITY: Ortho-nitrodiphenyl is readily soluble in most organic solvents but is practically insoluble in water, either hot or cold. Some of the materials in which ortho-nitrodiphenyl will dissolve are:

Benzene	Ethyl Acetate	Mineral Spirits
Ethyl Alcohol	Amyl Acetate	Pine Oil
Methyl Alcohol	Ortho-Dichlorobenzene	Turpentine
Ether	Carbon Tetrachloride	Linseed Oil
Acetone	Perchlorethylene	Soyabean Oil
Methyl Ethyl Ketone	Glacial Acetic Acid	Corn Oil

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Dept. O(P)13, Organic Chemicals Division,
1700 South Second Street, St. Louis 4, Missouri

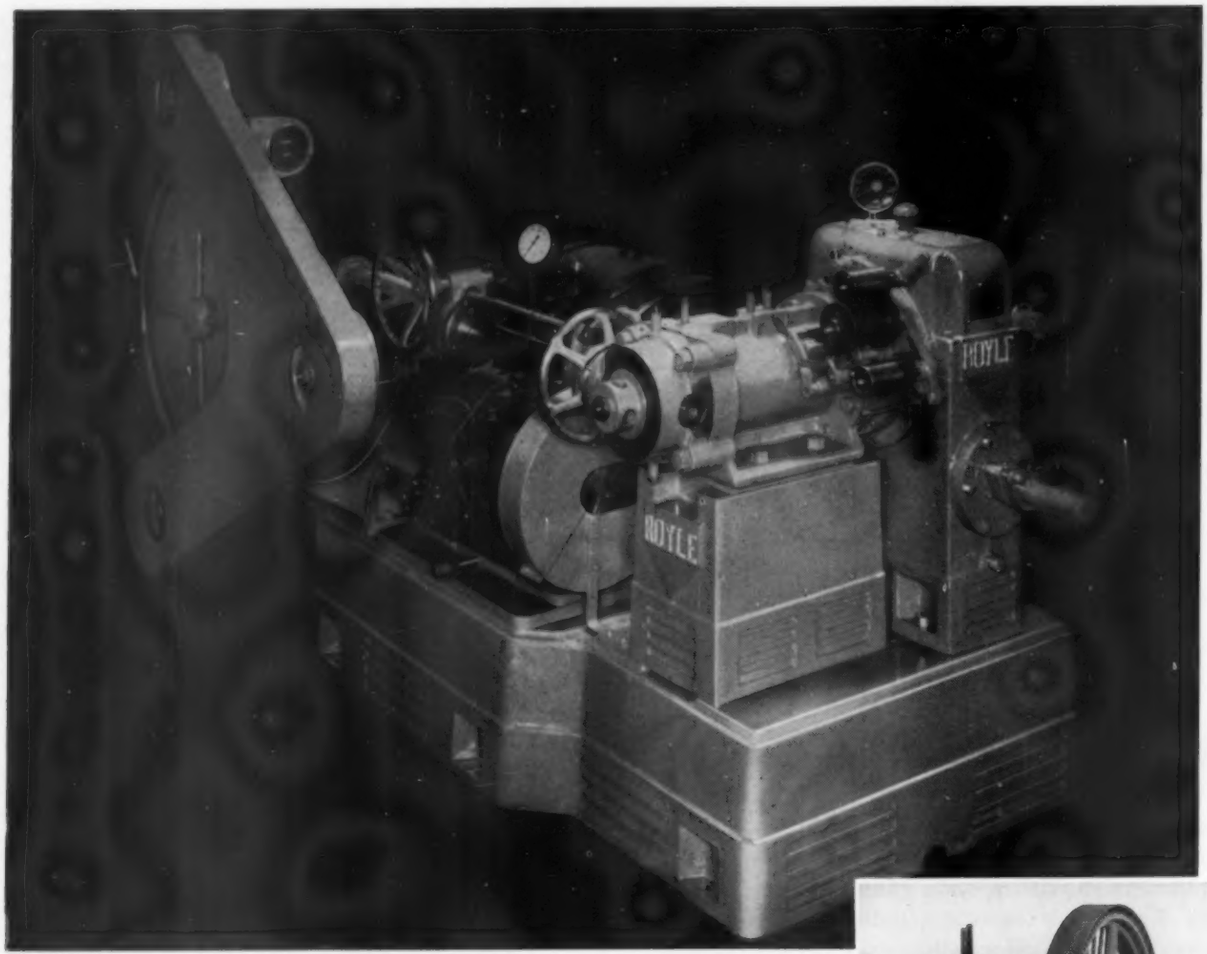
Please send, without cost or obligation, sample of Monsanto Ortho-Nitrodiphenyl and data on its use as a plasticizer.

*Name*_____

*Company*_____

*Street*_____

*City*_____ *Zone*_____ *State*_____



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For more than twenty years Royle 'Tubing' Machines were built and sold on a theory—the theory that it would be practical to form seamless tubing by forcing rubber through a die under screw pressure. That was the inception of the continuous extrusion process.

As the veil surrounding manufacturing processes—and goals—was lifted the uses and efficiency of Royle Continuous Extruding Machines expanded. Better products were produced at lower cost.

Today Royle Extruding Machines are designed to the requirements of the application involved. Into them goes all of the experience acquired in 65 years of pioneering in designing continuous extrusion equipment.

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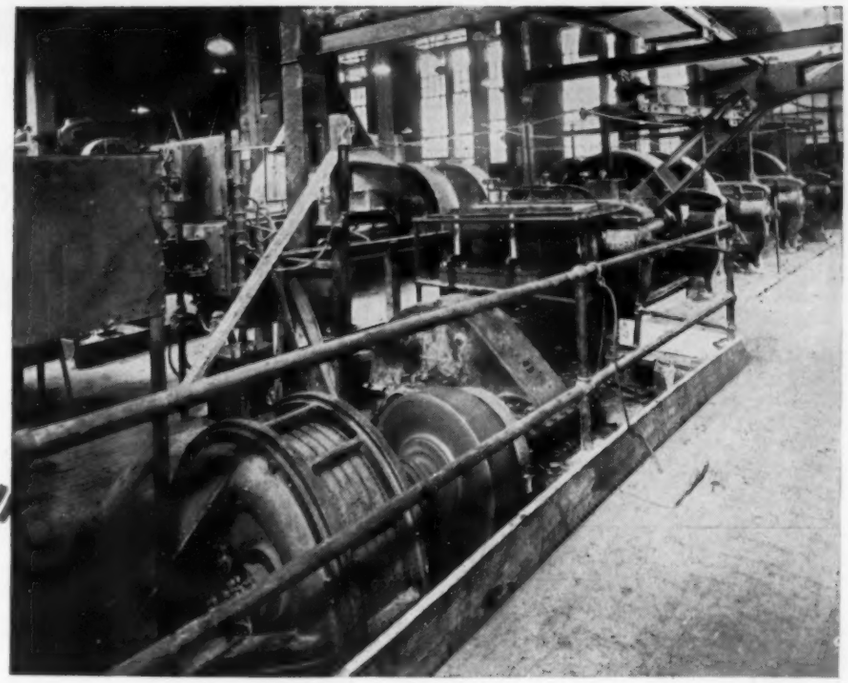

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The Fawick Airflex Clutch gives them new smoothness, new freedom from vibration, by operating through a cushion of air and rubber, as effective as the cushion of air and rubber that gives the motor vehicle comfort and longer life.

With this clutch, no springs, arms or toggles are needed. There are no adjustments to make—no lubrication required. Maintenance costs are low. Even misalignment is corrected automatically.

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Let our engineering department give you the benefit of their broad experience in the form of definite recommendations for your machines.

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VOLUME 57
NUMBER 3

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Published on the 15th of each month by

PALMERTON PUBLISHING COMPANY, INC.

Printing office,
East Stroudsburg, Pa.

Editorial and Advertising Offices,
250 West 57th St., New York 19, N. Y.

New England Representative—F. ROYAL CAREY, P.O. Box 133, Providence, R. I.
Western Representative—IRVING V. KOCH, 64 East Lake St., Chicago, Ill.

Entered as Second Class Matter, October 20, 1933 at the Post Office at East Stroudsburg, Pa., under Act of March 3, 1879. Subscription Rates: Domestic, $3.00 a year; Canada, $3.50; Foreign, $4.00. Single copies up to 3 months old, 35 cents; over 3 months old, 50 cents. Telephone COlumbus 5-2923, 5-2924.

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RUBBER AGE

VOL. 57, No. 3 JUNE, 1945

Electron Microscope Studies of Colloidal Carbon Reticulate Chain Structure

By W. A. LADD and W. B. WIEGAND

Research Laboratories, Columbian Carbon Co., Brooklyn, N. Y.

IN July, 1940, the particle size of Micronex was reported as 28 millimicrons and the shape of these colloidal carbon particles revealed as spheroidal *(1)*. The "agglomerated" areas apparent in the photomicrograph shown at that time were considered to be individual carbon particles piled on top of one another.

The idea of "structure" in carbons was introduced *(2)* to explain anomalously high values such as high Shore hardness and modulus, with depressed energy and tensiles for certain carbons, by postulating the presence and persistence of a carbon chain or network structure in the cured rubber. This "structure" concept also explained previously unrelated properties, such as the relatively high bulking value (low density), high sedimentation volume, high liquid absorption, low tinctorial strength, and dull (matte) surfaces in inks and paints. In rubber these properties correlate with low loading capacity, low uncured plasticity, high electrical conductivity, and electrical anisotropy.

In March, 1944, electron stereo-photomicrography revealed very clearly the reticulate nature of carbon "structure." With this new basic concept of carbon structure in mind, some of the electron photomicrographs, published before the full scope and significance of structure was realized, were re-examined.

In 1940 *(1)* an electron photomicrograph of carbon dispersed in dry nitro-cotton by a high viscosity milling technique was shown. On re-examination it is found that despite the validity of the phrase "nearly complete deflocculation" employed at that time, many carbon chains or fibers are present.

Following the introduction of the "structure" concept in 1941 *(2)*, a publication in March, 1942 *(3)*, reveals on further study another feature of carbon structure, namely a carbon rod linkage for Thermax. This print was included in a more complete series of photomicrographs published in September, 1942 *(4)*. These show a reticulate chain structure for Thermax, P-33, lampblack, acetylene, Micronex and Superspectra when dispersed by a high frequency discharge, a technique described fully in this article.

In May, 1943, Ragoss, Hofmann and Holst *(5)* showed electron photomicrographs of Thermax in which rods can be seen. As in our own early photographs, the presence of these was overlooked. They described the appearance of the particles as "a mass of frogs' eggs."

In March, 1944 *(6)*, differences in the persistence of this structure after severe milling in rubber were shown clearly in photomicrographs of rubber cements containing P-33 and acetylene. P-33 showed almost no persistence of reticulate structure whereas acetylene showed a very high persistence. Some residual rod linkage may be observed in this photograph of P-33 in rubber cement.

Electron stereo-photomicrography, which has been of cardinal importance in forming our basic concepts, was first used by von Ardenne in 1940 *(7)*. Stereophotographs of carbon in vulcanized rubber were shown. The specimens were prepared by crushing vulcanized rubber cooled by liquid air. Stereo-photomicrographs of a few carbons were exhibited by Schoon and

Koch *(8)* as a basis for their claim of an hexagonal or circular platelet form for carbon particles. Later however, in May, 1941, Heering and his co-workers *(9)* found the form of Thermax and P-33 particles to be spheroidal, thus substantiating the Columbian Carbon results of 1940 *(1)*.

Techniques Used in Structure Study

Several techniques were used in preparing specimens for carbon structure studies, as described below.

1. *"Sparking":* All "dry" mounts of carbon were prepared by an electrical discharge method used in this laboratory during the past four years. A glass microscope slide is inserted under a thin collodion film cast on a water surface. On lifting the slide a section of the film is carried away on the slide, and is then allowed to dry. The slide with the dry film is next placed on a brass plate and a small quantity of pigment placed on the film. The pigment is then dispersed over the film by means of the discharge from a Tesla coil. The film is next floated off the slide on a water surface and transferred to 200-mesh screen holders. This method gives an excellent dispersion of the pigment and requires only three to five minutes to prepare a specimen ready for use in the microscope.

2. *Coblac Method:* In the preparation of these specimens the carbon is pre-dispersed in nitrocellulose under high viscosity conditions *(10)*. The resulting dispersion is used directly in casting a film which provides a specimen showing carbon dispersion in a vehicle ("wet" dispersed).

3. *Mulling Method:* Dr. M. L. Fuller *(11)* has described an excellent technique by which he has obtained good dispersions of zinc oxide pigments, leaded zinc oxide, titanium dioxide, zinc sulfide, and lithopone. In order to adapt this method to carbons however, it was found necessary to devise a replacement for step 3 *(11)*. The complete method used in this laboratory is as follows:

STEP 1—Approximately 0.06 gm.* of the carbon is mulled on a glass plate with a glass muller with 0.5 c.c. of 1% by volume solution of poppy-seed oil in amyl acetate. The mulling is continued until the paste is nearly dry.

STEP 2—To the paste is added about 0.5 c.c. of 2% by weight solution of nitrocellulose in amyl acetate. This is mulled until the solvent has evaporated.

STEP 3—Approximately 25 c.c. of a 1% solution of nitrocellulose in a 4:1 mixture of toluol and amyl acetate is added and the mixture mulled long enough to put the carbon in suspension. A drop of this is then allowed to spread on a water surface and the final film transferred to the standard 200-mesh screen.

The most important factor in this method is the proportion of toluol to amyl acetate. The amount of toluol used, should be slightly less than the amount required to precipitate the nitrocellulose. Flocculation of the pigment during the casting of the film can be eliminated by increasing the ratio of toluol to amyl acetate. The toluol apparently produces a gelation stage during film casting which prevents flocculation. This method eliminates the use of a surface of a saturated solution of sodium chloride in water for casting (with subsequent required washing of the specimen) and gives convenient control over flocculation of the pigment during casting.

4. *Techniques for Vulcanized Rubber:*

(a) *Replica Method (12):* In this method a cured rebound block of tread stock is frozen and cracked into two pieces. An impression of the broken surface is then made with DeKhotinsky cement. A Formvar replica is made of this impression and photographed in the microscope.

(b) *Vulcanizing Method:* In principle this method consists of pressing out the uncured tread stock to a thin film and then vulcanizing the film *(12)*. The thin film is then photographed in the microscope.

5. *Silhouette Method:* A more recently developed method of studying carbon structure is shown in Fig. 1. A disc, the same size as the standard 200-mesh screen, is punched out of copper foil. This is cut and the center tab bent in an arc as shown. Coblac lacquer is then applied to the central tab. The disc is inserted in the microscope and the microscope focussed for the portion of the arc which has the electron beam as tangent. Any carbon projecting from the film will then show up as a silhouette. This method has already been successfully applied to broken surfaces of electrically conducting stocks. A thin sheet of cured tread stock is first frozen in an acetone dry-ice bath and cracked into two pieces. A small strip of the broken edge is cut off and wired to the central tab in place of the lacquer.

* This quantity varies with the carbon used.

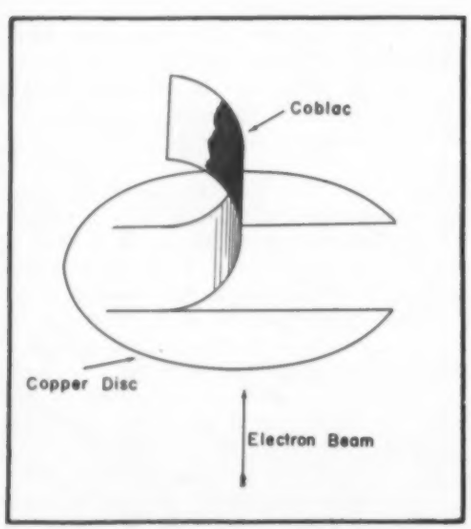
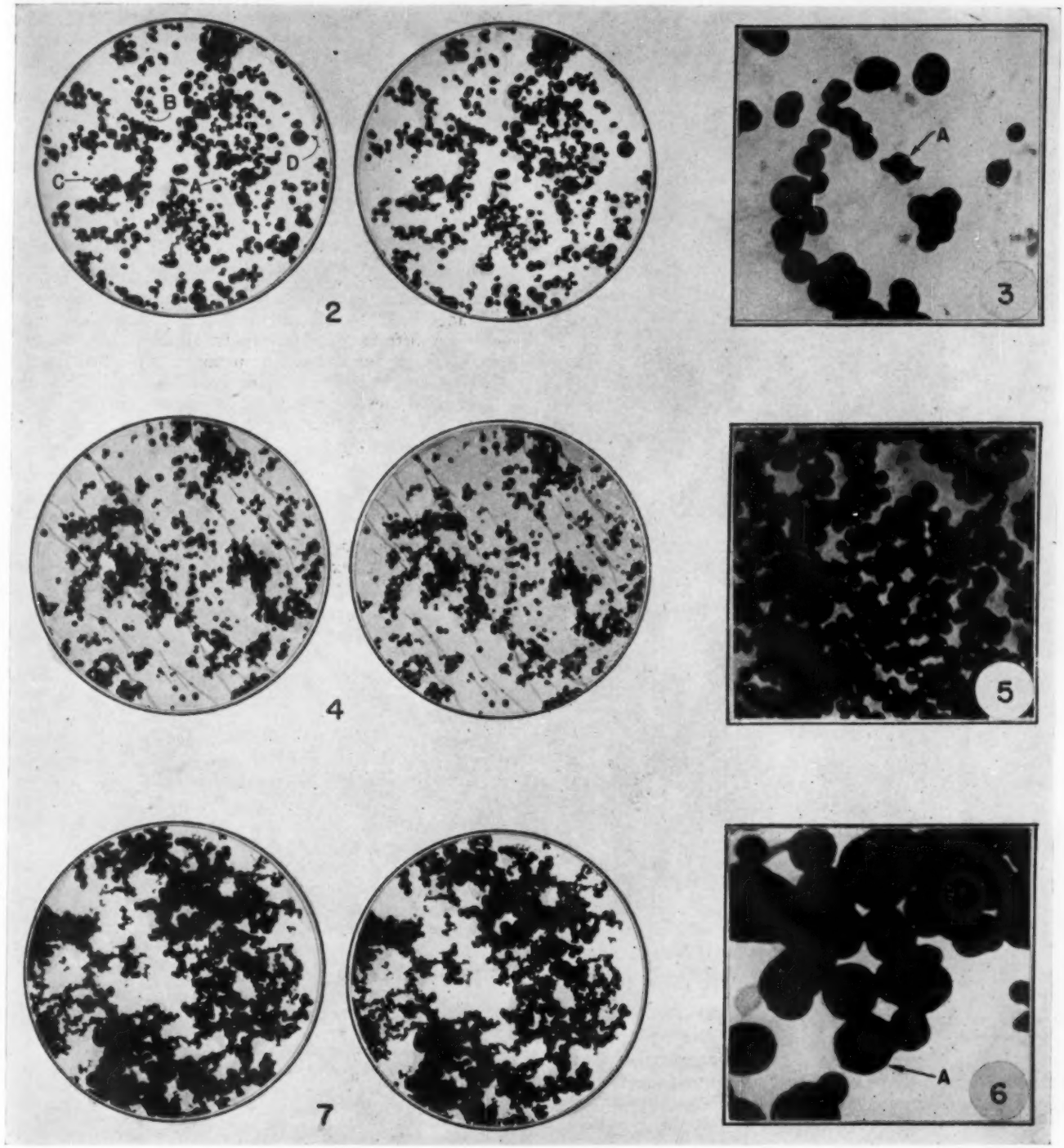


FIG. 1—Silhouette Method.

Revelations of Stereo-Photomicrography

Vectographs *(13)*, at magnifications of 15,000 to 25,000 diameters, are used in this laboratory for studying stereo-photomicrographs. However, stereo-photomicrographs can only be shown in a publication by the use of two separate pictures arranged in the standard manner for viewing with a stereoscope. The stereo-photographs shown are at magnifications of 3,000-5,000. Other photomicrographs are shown at magnifications of 5,000 and 10,000 diameters.

Dark areas in our early photomicrographs were originally considered to be loose agglomerates of individual particles undispersed by our sparking technique.

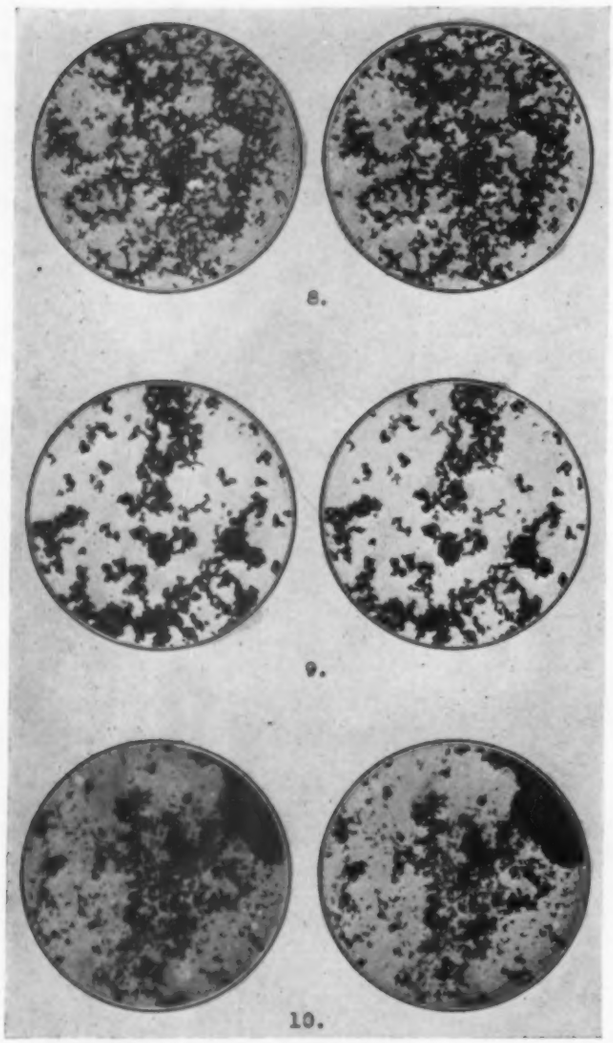


Carbons: Sparked

FIG. 2—Thermax (MT), x3,000
FIG. 4—P-33 (FT), x5,000
FIG. 7—Lampblack #18, x5,000
FIG. 3—Thermax (MT), x15,000
FIG. 5—P-33 (FT), x10,000
FIG. 6—Thermax (MT), x25,000

Stereo-photomicrography has shown this interpretation to be erroneous and individual spheroidal habit of colloidal carbons, as made, to be out-moded. This is revealed by examining the stereo-photographs of the carbons shown in Figs. 2 to 10 inclusive. All these specimens were prepared by the dry "sparking" technique which subjects the carbon structure to the least disturbing forces of any of the preparation methods used.

Thermal Carbons: Fig. 2 shows a stereo-photomicrograph of Thermax. The structure consists of spheroidal particles joined by rods. An excellent example



Carbons: Sparked

FIG. 8—Acetylene, x3,500
FIG. 9—Furnex, x3,500
FIG. 10—Micronex W-6, x3,500

of this is seen at A. Here two rods radiate from a single particle at an angle of approximately 120° to each other. Examination of a large number of photomicrographs indicates that a pattern in which three rods radiate from a single particle at approximately 120° angles occurs very frequently (see B). In addition, the axis of the rod generally does not lie on the line of centers of two particles but is skewed at an angle to it (see C). Further evidence of this angularity is shown by the ends of rods from which the particles have been broken off. The break (D in Fig. 2 and A in Fig. 3) is not at 90 degrees to the axis of the rod but is skewed at a small angle to this.

Fig. 4 is a stereo-photomicrograph of P-33. The structure is similar to that of Thermax. Here again it consists of spheroidal particles joined by rods. Patterns in which 3 rods radiate from a single particle at approximate 120° angles or three rods joined in closed triangles giving rise to 60° angles are common. Fig. 5 shows a sample of P-33 which has been subjected to a very light discharge. This is probably how the carbon appears before any breaking forces are applied; almost all particles are joined together by rods. Sparking, in general, breaks this into the usual groups shown in Fig. 4.

In Fig. 6 evidence of crystallinity in a small number of Thermax particles is noted. Particle A is one of the best examples of this. The photomicrographs of Ragoss, Hofmann and Holst *(5)* show pictures of Thermax particles having the same shape. These were due to graphitizing by heat treatment. Thus it would appear that the few particles observed in Fig. 6 were formed early in the furnace or on the hot checkerwork and were subjected to considerable heat treatment.

Lampblack No. 18, Acetylene: Lampblack No. 18 and acetylene, shown in Figs. 7 and 8 respectively, exhibit a different type of structure. There is no longer a rod linkage but instead the particles are fused tightly together in long chains with considerable branching. "Reticulate" best describes the appearance of this chain structure.

Furnace Carbons: A stereo-photomicrograph of Furnex is shown in Fig. 9. Here again the particles are joined closely together. The chains, however, are much shorter than those of lampblack or acetylene.

Impingement Carbons: Fig. 10 shows a stereo-photograph of Micronex W-6. The particles are likewise joined closely together in chains.

The above series of photomicrographs of "sparked" specimens lead to the following conclusions:

1. All carbons, before being subjected to any shearing forces, show a reticulate chain structure with lampblack and acetylene showing the greatest development of structure.
2. Thermal carbons are characterized by rod linkage structure; all the other carbons have a structure in which the particles are connected closely together. In lampblack and acetylene the particles are fused tightly together.
3. Evidence of regularity in the formation of the rod linkage is found. A very slight percentage of the Thermax particles show signs of crystallinity.
4. Some evidence of preferential "branching-angles" is subject to further study.

Persistence of Carbon Structure

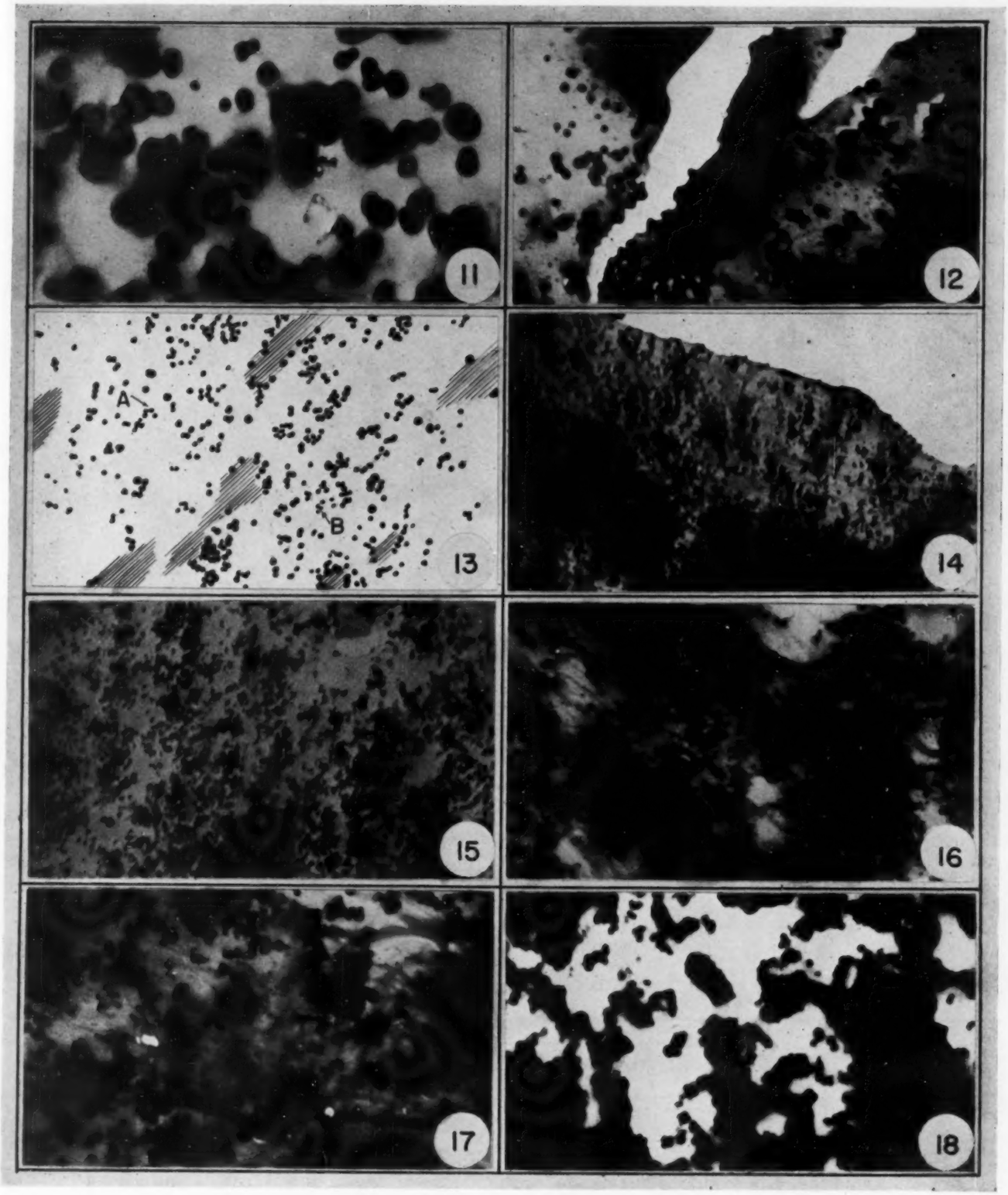
In order to determine whether carbon structure survives severe shearing forces, photomicrographs were taken of specimens prepared after milling in rubber, and after mulling in nitrocellulose.

Carbon in Rubber

The compounds used for the carbon-in-rubber specimens shown (and discussed below) are given in Table I.

Thermal Carbons: Electron photomicrographs of Thermax and P-33 in vulcanized GR-S are shown in Figs. 11, 12 and 13. Specimens for Figs. 11 and 12 were prepared by the vulcanized film technique. The pictures show some persistence of original rod linkage but a high percentage of break-down into discrete spheroidal particles.

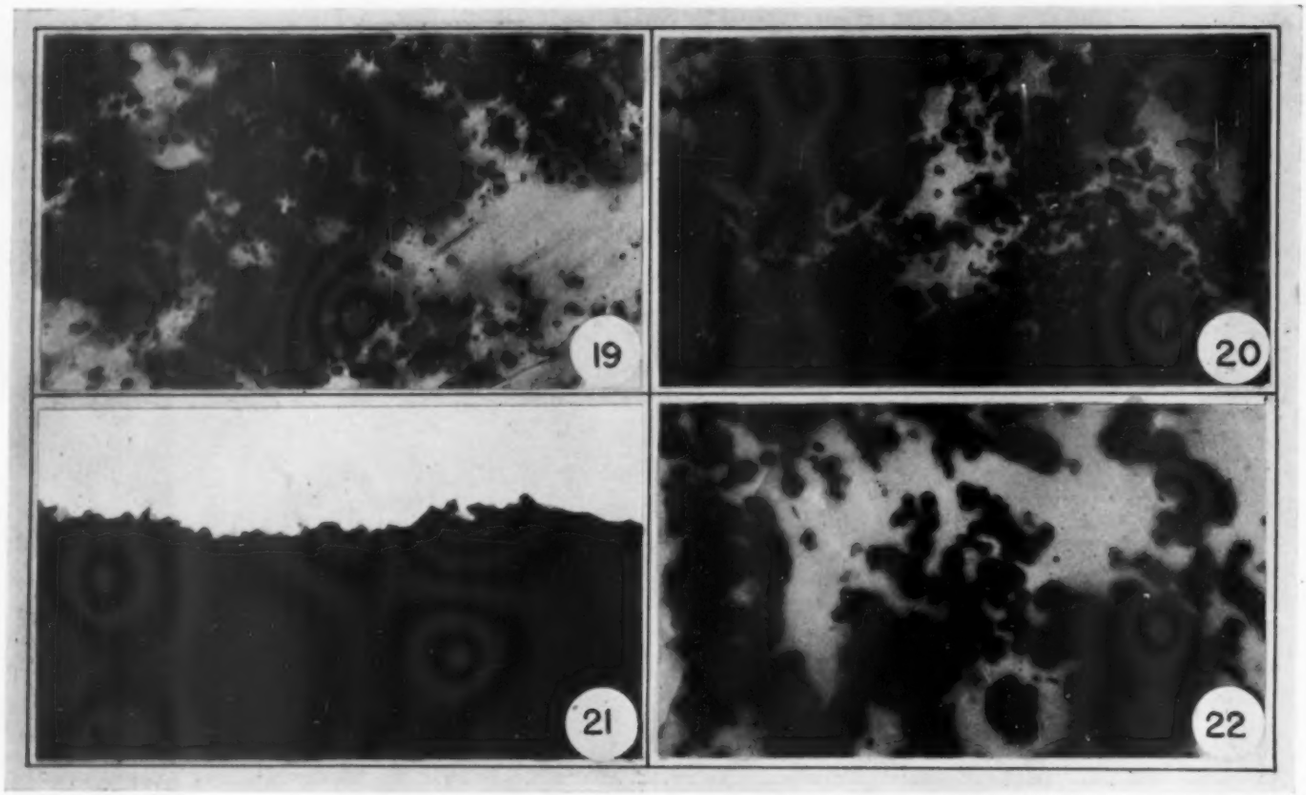
The replica method was used in preparing the specimen for Fig. 13 which shows the dispersion of P-33 in GR-S. This plate shows the same dispersion pattern as Fig. 12 thus indicating that the high pressures used in the vulcanizing technique have not produced



Carbons in Natural and Synthetic Rubber

FIG. 11—Thermax in Cured GR-S, x10,000
FIG. 12—P-33 in Cured GR-S, x10,000
FIG. 13—P-33 in Cured GR-S (Replica), x5,000
FIG. 14—Micronex W-6 in Cured GR-S, x10,000
FIG. 15—Micronex W-6 in Cured Hevea, x10,000 (app.)
FIG. 16—Statex B in Cured GR-S, x10,000
FIG. 17—Furnex in Cured GR-S, x10,000
FIG. 18—Furnex in Uncured Butyl

Loading: 30% for Fig. 14; 60% for Fig. 18; 50% for other figures.



Carbons in Natural and Synthetic Rubber (Continued)

FIG. 19—Statex 93 (HMF) in Cured GR-S, x10,000
FIG. 20—Acetylene in Cured GR-S
FIG. 21—Acetylene in Cured GR-S, broken surface
FIG. 22—Lampblack #18 in Cured GR-S, x10,000

Loading: 50%

any observable distortions. The groupings of particles *(e.g.,* at A and B) give the impression of rod linkage. This tracing was made November 9, 1943, several months before the existence of rods was discovered and offers excellent confirmation of the validity of the preparation technique.

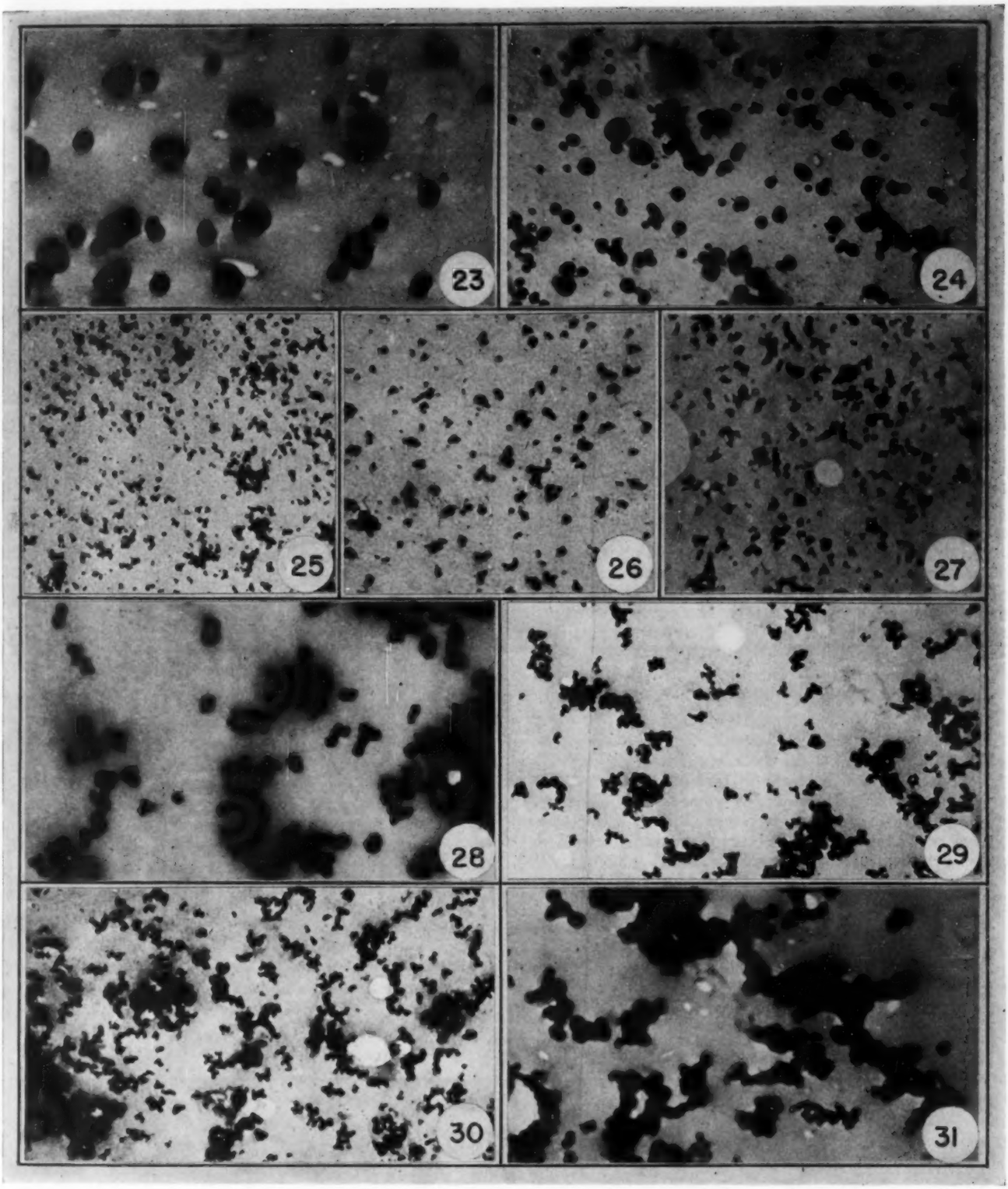
Micronex W-6, Statex B: The specimens for Figs. 14, 15 and 16 were all prepared by the vulcanized film method. All these plates show a break-down into a large number of discrete particles and short chains. Micronex W-6 shows the same dispersion pattern in natural rubber as in GR-S.

Furnex, Statex 93: Figs. 17 and 19 show pictures of Furnex and Statex 93 in GR-S. The specimens for these were prepared by the vulcanizing technique. The photographs show almost no discrete particles but mainly chains of moderate length.

Fig. 18 shows a photograph of Furnex in uncured

TABLE I—COMPOUNDS USED FOR CARBON-IN-RUBBER SPECIMENS

	Thermax (MT)	P-33 (FT)		Micronex W-6 (EPC)		Statex B (FF)	Furnex (SRF)		Statex 93 (HMF)	Acetylene	Lampblack #18
Fig. No.	11	12	13	14	15	16	17	18	19	20, 21	22
Smoked Sheets	....	....	....	....	100.0	....	....	....	....	....	....
GR-S	100.0	100.0	100.0	100.0	....	100.0	100.0	....	100.0	100.0	100.0
Butyl	....	....	....	....	....	....	....	100.0	....	....	....
Carbon	50.0	50.0	50.0	30.0	50.0	50.0	50.0	60.0	50.0	50.0	50.0
Zinc Oxide	5.0	5.0	5.0	5.0	3.0	3.0	5.0	5.0	3.0	5.0	5.0
Bardol	4.5	4.5	5.0	4.5	....	7.5	4.5	....	7.5	4.5	4.5
Pine Tar	3.0	3.0	....	3.0	2.0	....	3.0	....	....	3.0	3.0
Benzothiazyl Sulfenamide	1.25	1.0	....	1.25	....	....	1.25	....	....	1.25	1.25
Tetramethyl Thiuram Disulfide	....	....	....	....	....	....	....	1.0	....	....	....
B L E	....	....	....	....	1.5	....	....	....	....	....	....
Stearic Acid	1.0	1.0	....	1.0	4.0	....	1.0	3.0	....	1.0	1.0
Sulfur	1.8	1.8	2.0	1.8	2.7	2.0	1.8	1.5	2.0	1.8	1.8
Mercapto Benzothiazole	....	....	1.0	....	0.9	1.5	....	....	1.5	....	....
Water (added to Carbon)	....	....	....	....	....	5.0	....	....	5.0	....	....



Carbons after Sever Mulling

FIG. 23—Thermax (MT)
FIG. 24—P-33 (FT)
FIG. 25—Micronex W-6 (EPC)
FIG. 26—Statex A (CF)
FIG. 27—Statex B (FF)
FIG. 28—Furnex (SRF)
FIG. 29—Statex 93 (HMF)
FIG. 30—Acetylene
FIG. 31—Lampblack #18

All photographs at x10,000 diameters

FIG 32—Acetylene in Coblac.

Butyl rubber. The specimen was prepared by stretching a piece of tread stock to extreme thinness over a glass microscope slide previously coated with Formvar. A 200-mesh screen was then cemented to the thin rubber film and the films, with screen, floated off the slide on a water surface. The Formvar film is necessary to prevent the rubber film from breaking into fibers. As in the case of cured GR-S, the photographs show a break-down of the carbon chains into chains of moderate length. Comparison of the pictures also shows that the chain structure in the cured specimens is not due to flocculation of individual carbon particles into chains but is a break-down from chains originally of much greater length (as in the "sparked" specimens). It also confirms the essential validity of the vulcanizing technique.

Acetylene, Lampblack: Vulcanized rubber films containing acetylene and lampblack are shown in Figs. 20 and 22 respectively. Both of these show essentially long chains. Fig. 21 shows acetylene in GR-S. This specimen was prepared by the silhouette method. Chains of carbon are seen protruding from the broken edge of the rubber stock.

Carbons in Nitrocellulose Vehicle

A series of carbons in nitrocellulose prepared by the mulling technique is shown. This method has been found most satisfactory and has been adopted as a standard technique for determining persistent carbon structure.

Thermal Carbons: Figs. 23 and 24 show Thermax and P-33 after mulling. The fields are essentially particulate. The break-down is probably due to the fact that shearing forces acting on the large particles produce a large torque on the relatively thin rods.

Micronex W-6, Statex A, Statex B: Figs. 25, 26 and 27 show that these carbons are broken down into a large number of individual particles and short chains. Statex B has the greatest proportion of short chains to individual particles of the three carbons.

Furnex, Statex 93: Figs. 28 and 29 show a break-down into chains of moderate length. Very few individual particles are found. Statex 93 has slightly longer chains (more particles per chain) than Furnex.

Acetylene, Lampblack: Figs. 30 and 31 show these two carbons to have the highest persistence of reticulate structure of all the carbons. The fields show essentially long chains with those of lampblack being longer than those of acetylene.*

Coblac film studies show essentially the same break-down as obtained by the mulling method. Fig. 32 shows acetylene in Coblac photographed by the silhouette method. Projecting chains of carbon are readily seen.

Summary and Conclusions

1. All carbons are born in families, not as individuals. The expression "Reticulate Chains" has been chosen as best describing this original state of the "loose" carbon, as collected.

2. The Thermal carbons have a distinctive type of inter-particle bonding which has been named "Rod Linkage." These rods are not radial. When broken the rods frequently exhibit skewed fractures. There is evidence of regularity in the formation of the carbon units.

3. All other carbons, in their "loose" state, show their ultimate spheroidal particles to be connected closely together. In the case of acetylene and lampblack the words "Fusion Linkage" best describes both the appearance and the persistence of the carbon chains, even after strenuous manipulation.

4. The original reticulate chain condition of all carbons suffers a widely differing fate,when subjected to energetic manipulation, as by mulling, Coblac treatment, or rubber milling. These basic differences are

* The modulus developed by this war-time (1942) sample of acetylene black was below expectancy for standard acetylene black.

Table II—Classification of Carbons

Class	*Examples*	*Type*	*Condition as Formed*	*Appearance after Severe Milling*	*Persistence of Reticulate Chains*
I	(a)* Thermax (a) P-33	Non-Structure	Reticulate chains	Essentially particulate	None
II	(a) Statex A (b) Micronex (c) Statex B	Normal	Reticulate chains	Particulate and short chains	Low
III	(a) Furnex (b) Statex 93	Intermediate Structure	Reticulate chains	Mainly chains of moderate length	Intermediate
IV	(a) Acetylene (b) Lampblack	High Structure	Reticulate chains	Essentially long chains	High

* a, b and c respectively denote increasing persistence of reticulate chain structure.

shown in Table II in which the carbons are arranged as to persistence of reticulate chain structure.

5. Specific surface or acreage calculations based on electron photomicrographs† require a minus correction factor depending upon the degree of persistence of carbon to carbon contacts. For thermal carbons this factor may be ignored because of the break-down into individual particles on severe manipulation, and of the contribution of the rod area where the break-down is not complete.

6. To date, the general picture as regards dispersion of the carbon phase shows no sensible differences as between GR-S and Hevea.

7. J. H. Fielding in a publication on "Flex Life and Crystallization of Synthetic Rubber" *(14)* states, "Natural Rubber and Butyl B are similar in that stretching produces fibering; their flex life is good and high tensile gum stocks are possible. GR-S and Buna N lack all semblance of fibering. Gum stocks have low tensile and, in general, flex life is poor." H. Mark *(15)* likewise states, "It seems that from the point of view of ultimate irreversible failure the existence of small reinforcing crystalline areas is advantageous." Recent studies at the Columbian Carbon Company's Laboratories have indicated that in the reinforcement of non-crystallizable polymers the controlled use of carbon chains, or fibers, of moderate length may prove highly advantageous.

† "Columbian Colloidal Carbons," Vol. III (4), states "only particles that are discrete or reveal a full diameter are measured."

ACKNOWLEDGEMENTS

Acknowledgment is made to H. A. Braendle for many helpful suggestions, particularly in regard to the mulling technique; also to Margaret F. Ladd who prepared the "sparked" and mulled specimens and took many of the electron photomicrographs.

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Protection from Toxic Effects of Organic Solvent Vapors

ALL volatile organic solvents, including gasoline, benzene (benzol) naphtha, carbon tetrachloride, and trichlorethylene, give off toxic vapors. Hence, workers using any of these solvents in cleaning, degreasing, cementing and other operations must be protected from the effects of inhaling excessive amounts of their fumes.

Basic protection is provided by keeping the concentration of solvent vapors in the general atmosphere of the workroom below "the maximum allowable concentration (M.A.C.) for continuous exposure." This limit, which represents the maximum concentration of solvent vapor to which workers may be continuously exposed during the eight-hour work day, has been established by the American Standards Association for several of the commonly used solvents, but many states have standards of their own. The limits vary from 50 parts of solvent vapor per million parts of air for benzene to 1,000 parts per million for petroleum products unmixed with more toxic substances.

Natural ventilation may suffice to provide this basic protection where the contamination of the atmosphere is slight, as where the solvent is being used in small quantities or is applied in equipment that prevents the escape of vapor. In other cases, it may be necessary to employ some form of mechanical ventilation, such as a local system which will draw off the vapors as they arise or strong general ventilation which will rapidly dilute the vapors to a safe level, as advised by a ventilating engineer.

Working conditions in a plant are probably satisfactory if the air is free from the pronounced odor of the solvent being used; but, since odor is not an adequate criterion, an atmospheric survey should be made. This requires the services of a competent chemist. In some states, such work is done by the State Industrial Hygiene Department on request: However, even where the workers as a group are effectively protected by these measures, certain individuals may be endangered by practices like the following:

(1) Using solvents in poorly ventilated areas, such as small rooms, basements, pits, etc.; (2) Applying solvents in close proximity to the face, as in spotting garments or cleaning floors or machinery; (3) Working over open containers of solvents; (4) Handling products damp with solvents; (5) Opening containers or equipment holding solvents in such a manner that high concentrations of the vapor are inhaled; (6) Permitting drafts to blow solvent vapors in the direction of workers; (7) Allowing persons to work with solvents to which they are abnormally sensitive; (8) Entering tanks containing solvent vapors without proper respiratory protection.

It is not enough to prohibit such practices. Workers must also be educated to the dangers involved, and constant supervision must be maintained to prevent any one from taking chances. When workers are unavoidably subjected to excessive concentrations of solvent vapors, they should be protected with suitable gas masks. Where the vapor concentrations are relatively low, canister-type masks approved for organic vapors by the U. S. Bureau of Mines may afford adequate protection; but, for high concentrations, as in vapor-filled tanks, approved air-line respirators must be employed.

Safety Research Institute

Technical Problems in Connection with Reclaiming Synthetic Rubber

By F. S. CONOVER

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BEFORE going into the problems of an industry, some understanding of the background and processes of that industry is necessary. The reclaiming industry has a long and brilliant background and its present processing methods are the results of good management combined with forward-looking engineering and able chemical research.

Prior to the discovery of vulcanization, reclaiming was no problem at all. It was necessary only to rework the product on a mill if it was fabricless or to soak the rubber out of the fabric with a solvent if cotton or other fibers were present. Following the discovery of vulcanization however, reclaiming was not so easy, and rubber men were faced with steadily growing accumulations of unutilizable scrap material made from an expensive product.

In 1853, Goodyear himself took out a patent in England for the manufacture of crumb rubber which consisted merely of grinding the rubber scrap until a relatively fine material was obtained. It is interesting to note that for some purposes this method is still used. In 1858, two chemists named Hall and Bushnagel, softened rubber by boiling it with water and then milling it with tar. The process was later improved by using pressure to get temperatures up to 600° F. This is the basic feature of today's heater process of reclaiming rubber.

About 1868, E. H. Clapp separated fabric from rubber by hand. The fabric-free rubber was ground fine, steamed, and milled with oil. The frictioned fabric itself was ground very fine and the fibers were removed as far as possible by being blown out with air. From this point on, the remaining rubber was treated the same as before. This material was called "shoddy," and the name stuck, for it was a shoddy material. However, it had its uses, although it was unfortunate that up until a few years ago all reclaims were considered shoddy.

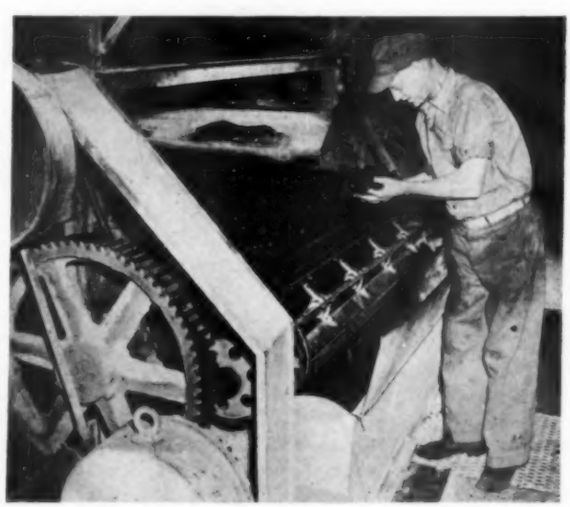
The Acid and Alkali Processes

In 1881, Chapman Mitchell developed an acid process in which the rubber and fabric were boiled for several hours in a 20% solution of acid and then washed, drained, mixed with oils, and heated at 300° F., after which it was milled and slabbed. In the 1880's Mr. Mitchell started the Philadelphia Rubber Works. Late in the 1800's, Marks & Price, two young chemists with the Boston Woven Hose & Rubber Co., worked together for a while on a new reclaiming process. They could not agree and eventually Mr. Marks patented a process for treating ground scrap in a jacketed pressure kettle with 3% caustic soda for 24 hours at 125 lbs. steam pressure. The devulcanized product was then removed, washed and milled.

Mr. Price treated ground scrap with caustic at such concentration that the boiling point at atmospheric pressure was higher than 232° F., the melting point of sulfur. Somewhat later this process was changed so that it was no longer carried out at atmospheric pressure, but was done in open steam. Marks' patent is really the basis for our present alkali process. Today about 16% of reclaim production is made by the process of Hall and Bushnagel, approximately 3% is made by Mitchell's acid process, and the remaining 80% is made by the Marks' alkali process or some modification of it.

Operation of a Typical Plant

Present day reclaiming demands the maintenance of a large scrap supply in order to secure not only adequate supplies of raw materials but certain uniformity



Reclaimed stock coming out of the dryer after being chopped up, devulcanized and washed.

Note: This is the second of three papers comprising a Symposium on Synthetic Rubber Reclaim presented before the New York Rubber Group on April 13, 1945. The paper on "Compounding Problems with Synthetic Rubber Reclaims," by E. B. Busenburg, appeared in the May, 1945, issue of RUBBER AGE. The paper on "Economic Factors Involved in the Transition from Natural to Synthetic Rubber from the Reclaimers' Standpoint," by John S. Plumb, appears in the June, 1945, issue of *India Rubber World*.

of the source of supply. Tires are shipped in bulk, but most other scrap is baled. The operation of a typical reclaiming plant would be somewhat as follows:

Tires are kept in storage until they get a chance to dry, since in the Winter time relatively large amounts of ice and snow are quite likely to be found inside of the tires. From the storage room they are delivered to a machine which removes both beads. After this debeading operation, they are chopped quite fine and run through a large cracker. The cracker is a very heavily built two-roll friction mill with grooved rolls to provide some cutting action. After cracking, they are screened to remove coarse material and then pass on to magnetic separators which remove iron. Other types of scrap may be given somewhat different treatment up to this point, but the end result is essentially the same and the scrap is ready for the reclaiming process. Tires were used for this illustration because they are by far the largest source of the reclaimer's raw material.

Ground scrap is charged into a digester along with certain swelling agents and liquid caustic soda. It is held for 10 to 24 hours at 150 to 200 lbs. steam pressure, depending on the type of scrap, how finely it is cracked, and other factors. During this devulcanizing period, the fabric is destroyed and the rubber is reverted and softened. The mass from the digester is discharged into a blow-down tank and goes from there to washing screens which remove excess alkali and other undesirable material. It is then squeezed in a rotary screen press to remove excess water and sent on to a mechanical dryer.

The heater process is used mostly for fabric-free scrap stocks. The ground scrap is mixed with oil and binders and possibly some liquid caustic in a mechanical internal mixer. This mixture is placed in a boat and charged into a devulcanizer. Open steam at 150 to 200 lbs. pressure for 5 to 20 hours is used. After removal from the devulcanizer, the rubber is taken out of the pot and broken up to cool.

Final Steps in the Reclaim Process

The final steps for either devulcanized or digested stocks include the blending of various intermediates and compounding ingredients in a Banbury mixer or on a mill. After mixing, sheeting mills are used to mass the stock and put it into workable condition. Following this, the compound is put through a strainer to remove foreign matter including non-ferrous metals and goes from there on to the refiner and finally through a finishing mill, where it is sheeted at gauges from .003 to .008, after which it is slabbed off preparatory to shipment. These details have been given in order to provide some background for the rest of this article, and before going on to the technical difficulties involved I should like to point out some of the things which have been accomplished.

The reclaiming of all currently important types of synthetic rubbers has been successfully accomplished. This has been done with equipment now in common use. This equipment represents many millions of dollars and the proper use of it through experience is worth many millions more. New equipment or drastically new methods would be not only uneconomical but most undesirable in view of time, materials, and manpower requirements.

Reclaimed synthetic stock being squeezed through a screen in one of the tubing operations.

In February, 1942, Otto Bachle of Germany was granted a patent for reclaiming rubber or Buna. His process was essentially the kneading of ground scrap with oil and a monoaryl hydrazine (phenyl hydrazine) and heating at 140° C. for 10 to 20 hours while bubbling an oxygen containing gas through the mix (air). (U. S. Patent 2,273,506).

In July, 1943, F. L. Kilbourne patented a process for reclaiming neoprene and various butadiene copolymers (Buna S and N). He noticed that heat for prolonged periods of time hardened these synthetics instead of softening them and based his patent on heating at temperatures over 212° F. for periods not in excess of 2 hours. In this process, it is necessary to use combinations of swelling agents and softening agents. Swelling agents include the naphthas, turpentine, dipentene and cymene. Softening agents include certain oils, resins, asphalts, pine tar, mineral rubber, rosin, etc. The ground scrap, swelling agents and softeners are mixed together, subjected to open steam at proper temperatures and for suitable times, and the excess solvent may be removed by vacuum during the cycle.

Reclamation of Polychloroprenes

In March, 1944, W. G. Kirby and P. M. Elliott secured a patent for the reclamation of polychloroprenes. This process can be carried out by either the digester or the heater process. Kirby and Elliott discovered that materials of the type R-COOH, wherein R may be H, CH, COOH, or an aliphatic hydrocarbon group of from 1 to 18 carbon atoms, will accomplish the reclaiming of neoprenes. Where R is an aliphatic hydrocarbon group, it may be further substituted by other radicals such as hydroxy, alkoxy,

aldehyde, keto, or carboxyl. Heating time may vary according to the type of scrap and temperatures used. Three to 20 hours at 300 to 420° F. is the usual practice. (U. S. Patent 2,343,558).

In the same month, March, 1944, W. G. Kirby and L. E. Steinle obtained a patent for reclaiming neoprenes by mixing the ground scrap with certain sugars or starches which may be converted into sugars during the reclaiming process. The work may be done in either digesters or devulcanizers. Two to 20% of the reclaiming agents may be used, times may vary between 3 and 30 hours, and temperatures may run from 300 to 420° F. The reclaiming agents include sucrose, dextrose, maltose, lactrose, etc. (U. S. Patent 2,343,-559).

Kirby and Steinle in September, 1944, again secured a patent for reclaiming Buna rubbers. A small amount of a di (hydroxy aryl) sulfide is mixed with the scrap which is then used with typical digester or devulcanizer charges. Time and temperature were in the neighborhood of 388° F. and 16 hours. (U. S. Patent 2,359,122). In November, 1944, Kirby and Steinle secured a patent which applies these principles to reclaiming neoprene.

Many advances have been made since the issuance of these patents. For reasons of national security, government secrecy orders have been revised to cover some developments which will probably be published as patents at some future time.

Difficulties Still Facing Industry

Having examined briefly the history and progress of the reclaiming industry up to date, it is possible to intelligently examine problems still confronting us. Each one of the patents which have been listed and outlined represents a step further in the reclaiming industry, and each further step means that another problem has been tackled and solved.

There are, however, a number of difficulties still confronting the industry. As has been pointed out, practically any of the synthetics can be reclaimed, and compounds containing both synthetics and rubber can be reclaimed, providing the synthetics and rubber were mixed together as far back as the Banbury or mill. It is impractical at the present time to reclaim mixtures of rubber and GR-S, or rubber and neoprene or Perbunan, that have been cured separately or that have been cured together as individual products (layers). Mixtures of GR-S and neoprene or Perbunan are somewhat easier to handle, while mixtures of Perbunan and neoprene present no problem.

The first big problem confronting the reclaimer is to learn how to reclaim any synthetic or any combination of synthetics together, even if they are added as distinctly different compounds when put into the devulcanizer or heater. Any drastic changes in equipment are undesirable for obvious reasons, so that the problem becomes a chemical one and in the ultimate analysis resolves itself into a search for new chemicals or the more efficient utilization of old ones. Although this has not yet been done there seems to be some probability that research along these lines will in time provide an answer.

In the meantime, until such an answer is found the problem of segregation and sorting of scrap materials is of supreme importance. If scrap either from the factories or any other source is delivered to the reclaimers as a mixture of all types of rubber and synthetics, the reclaimer is faced with the appalling task of examining every individual bit of scrap that comes into his plant. Methods for identification have received much attention, some of them are quite promising. They all, however, take time and the lag between receipt of material and the testing of individual pieces is entirely too great even by the best methods. To examine even without testing every piece of scrap going through the reclaim process would probably require as many people as are now required to run the plants. This creates an obviously impossible situation.

Classifying Factory Generated Scrap

For factory generated scrap, the classification should be carried out at the point of generation of the material. The rubber manufacturers themselves should make every effort to classify and segregate the various scraps generated in their own plant. This is the logical place to do it, since they are the only people who know what is in the scrap without having to test it.

As has been mentioned before, mixtures of GR-S and rubber are difficult to reclaim unless this mixing is done as far back as the original compounding mill. Tires that are on the road today usually have a rubber carcass to which has been vulcanized a synthetic tread. Reclaims made from whole tires of this type are of poor quality. In order to reclaim them properly, it is necessary to separate the tread from the carcass before going on with the reclaiming process. This takes time, men, and money, and still leaves enough synthetic mixed with the rubber to result in some diminution of quality.

Tires have always been the chief source of supply of raw materials for the reclaimer. The national stockpile, plus what the reclaimers have in their yards at present, may last another year or a little more. At the end of that time unless we have found how to reclaim mixtures, and unless the rubber manufacturers are willing to cooperate to the extent of segregating their scrap as much as possible, the reclaimer will be faced with a severe shortage of raw materials. This would be a national catastrophe. Between the time that natural rubber was cut off and Buna rubber was brought into production, the reclaiming industry kept this country and its war machine on wheels during an extremely critical period, and if it had not been for the efforts of the reclaiming industry our war effort would have completely bogged down.

All danger of a situation of this kind is not completely over. The demands of the military, plus delays in necessary equipment to satisfy civilian needs, indicate that many more civilians are going to be walking within the next year unless the gap is again filled.

The reclaiming industry believes that further technical advances and cooperation from all parties concerned can and will solve these problems.

BACK THE ATTACK
BUY
WAR BONDS AND STAMPS

Postwar Planning for the Rubber Manufacturer

By ARTHUR ROBERTS

THE war has given the rubber manufacturer plenty of headaches and one big reason is that he never knows what is coming, he can't plan. This year he is asked to turn out 50 per cent more truck tires than in 1944, more footwear, conveyor belting, hose, heels, soles, etc., yet, the supply of raw materials is low due to heavy war requirements. No one doubts that he will pull the rabbit out of the hat, but it's a hectic life in the meantime.

This inability to plan, and the difficulties resulting therefrom, should be a lesson to every rubber manufacturer anent the value of planning. The postwar period will bring into the picture problems of magnitude at least equal to those confronting businessmen now, although these problems may differ in kind—and now is the time to plan your plan of operation after the Japs say "Uncle."

No Single Pattern to Follow

Each member of this industry must "roll his own," there is no one pattern to follow. He must analyze his own position and then draft a program based upon an intelligent appraisal of essential factors peculiar to his business. It may be only a rough draft, but the time and effort spent along these lines will not be wasted because it will bring into bold relief the many problems that are etched into the picture and which by-pass the mind until attention is focused on them through detailed analysis.

Here are some of the things to consider in planning postwar operation: What has the war done to your resources? Is your working capital ratio better or worse than before the war? How does your financial standing compare with that of prewar days? Has your net worth increased or decreased? Has your machinery and equipment a trade-in value or is it practically worthless in a trade? What will it cost you for deferred repairs to business buildings and equipment?

Many businessmen have been stymied on repairs because they could not get materials or service men during the war or sub-standard repair work had to be made because the usual grade of repair work was unobtainable. Many temporary repairs have been made during the war which will have to be re-done in the postwar period, and remember that deferred repairs are always more costly than when made pronto. Will such repair work set you back substantially, affecting your investment in postwar modernization, expansion and promotion? If you figure on expansion, what will it cost you? What volume must you get to pay the over-all cost of doing business and net a profit on the enlarged operation? How much must you appropriate for advertising, either to re-build prestige lost through discontinued advertising during the war or to get enough volume to promote sales with maximum profit in the postwar period?

Quite a large order, you say, which involves forecasting into the postwar period when anything may happen, and many rubber manufacturers were never good hands at budgeting operations in normal times. Right, and precision results are not to be expected. Nevertheless, it will pay to ruminate on these things and get some sort of a focus before the time comes to act, not just a hazy mental picture but a pencil-and-paper plan. As the postwar period approaches, adjustments can be made to the plan, as is common with all types of business forecasting, but this idea of systematic planning for postwar expansion, modernization and promotion NOW is sound and imperative.

What were your business costs before the war? What have they been during the war? Have costs gone up or down? Why? The war has forced all businessmen to pay greater attention to operating economically, which will help them do a more efficient managerial job in the postwar period if they capitalize on their war experiences.

What has high taxation done to your net profit? Where has it left you on pocket-profit? Will it be necessary to increase volume considerably to average the same percentage of net you earned before the war? If so, how much volume will you need and what steps must you take to assure it? What about the write-off on equipment? If you have taken enough depreciation during the past to absorb original cost in a period of time that coincides with actual wear, tear and obsolescence, you are safe. If wear, tear and obsolescence take their toll before the assets are written off on your books, you stand to lose the difference. This is a sock at net worth, weakening your financial position, making it just that much more difficult to get credit accommodations in the postwar period.

Credit an Important Factor

How much will you need to swing your postwar business program? How much will you have in the kitty for this investment? If you haven't enough money to finance your postwar program at war's end, can you get credit? If your financial position shows up badly you may have a hard time getting credit accommodations, and it is poor business to wait until you decide to invest to find out. Will you need additional working capital to finance postwar operations? Will your own funds, as indicated by the current ratio on your balance sheet, do the trick? Working capital is not investment capital. The former supplies the funds to pay current bills, payroll, taxes, etc., while the latter is taken from surplus cash that has been set aside to modernize or expand. If surplus funds are un-

available in your own organization, you may get the money through a loan or credit, providing your balance sheet ratios and net worth rate it.

Remember that expansion or increased promotional activity in the postwar period will "up" the demand for working capital over prewar and wartime operation, the increase depending upon your postwar activities and hopes. If you expect to expand, say 25 per cent, or to go heavier on postwar promotion by 25 per cent, your need for working capital will increase by 25 per cent, and you must see to it that your business supplies it.

Too many businessmen we have talked to in the past few months are being "needled" by the reassuring picture on our war fronts, and they see in the offing a postwar period free of restrictions where they can buy and sell as of old. But the end of the war and the removal of restrictions will bring in Gremlins, at least as bad, if not worse, than those we know today, so rubber manufacturers who do not anticipate their postwar problems now and plan to tackle them effectively when they arrive, will find themselves in foxholes.

Fore-warned is fore-armed. Complacency about war in peacetime cost us plenty in blood, sweat and tears. A similar attitude toward postwar problems will get the same result in the postwar period and build profits for only one man—the maker of aspirin.

Use of Polyvinyl Chloride for Prostheses

PROSTHESES, or artificial features, have been made from metal painted to resemble tissue, gelatine-glycerine mixtures, hard rubber, wax, acrylic resins and latex, among other materials, but in almost every instance some property of the material tends to lower its perfection. In view of the inertness and flexibility of plasticized polyvinyl chloride compositions, it was believed that polyvinyl chloride might prove an acceptable material and accordingly Imperial Chemical Industries, Ltd., of England, has done some experimental work along these lines. Their method, as reported in a recent issue of *Plastics* (England), follows:

It is well known that polyvinyl chloride swells in the presence of plasticizers such as tricresyl phosphate, dibutyl phthalate or dihexyl phthalate, and may be dissolved at elevated temperatures to form flexible rubber-like products. The physical properties of the resultant materials depend both upon the proportions and upon the type of plasticizer used. The completely "gelled" plasticized compositions are thermoplastic and can be molded by compression or injection methods. Polyvinyl chloride-plasticizer mixtures can also be prepared in the form of pastes, varying in consistency from thick cream to that of putty. These pastes can be transformed by heat to flexible rubber-like products, and shaped during the process by a simple molding operation. It was considered that this technique would be particularly suitable for making prostheses, which are often complex in form and of varying thickness.

The following problems were investigated: (1) Development of a composition suitable for the production of an adequately flexible restoration and having a reasonable shelf life; (2) Development of the best gelation technique, *i.e.*, the optimum temperature required to produce a restoration of the maximum strength. Thin edges may be required for attaching the prostheses to the skin, and are insufficiently strong unless a relatively high temperature of gelation is employed; (3) Finding of a pleasing "base" color; and (4) Development of techniques to secure accurate fitting.

The use of dibutyl phthalate instead of the more usual tricresyl phosphate as the plasticizer involved difficulties in obtaining a paste having an adequate shelf life, and it was finally decided that for the time being the paste should be made from the polymer and the plasticizer immediately before use. Polyvinyl chloride compositions are more flexible when plasticized with dibutyl phthalate than with an equal amount of tricresyl phosphate.

A temperature of gelation of 140° C. was found to give satisfactory restorations, but introduced difficulties due to discoloration of the composition, particularly because of the omission of a lead salt stabilizer. A wide range of satisfactory pigments has not yet been developed, but good results were obtained in a "natural" pink shade by the use of cadmium red together with a white pigment. Initially titanium dioxide was used for this white pigment, but zinc oxide was found to give better color stability.

The method of making a restoration, *e.g.*, a nose, is as follows: The nose is made in wax or "Plasticine," either modelled to the patient's face or to a plaster mask of the face secured by a moulage method. The wax or "Plasticine" is then invested in one half of a large dental flask in plaster-of-Paris. When the plaster has set the "Plasticine" is removed, and new hot wax poured into the cavity to replace it to a uniform thickness all around the mold, thickening where this is necessary, for example, at the tip of the nose, but realizing that the thicker the wax the heavier the final restoration will be. Plaster-of-Paris is then poured in, and the reverse half of the flask filled with plaster and closed. When this investment has set entirely, the flask is placed in boiling water until the wax is entirely removed. The flask and plaster investment are then thoroughly dried out in an oven, to ensure that the necessary temperature of gelation will be attained. When quite dry the mold is removed from the oven and allowed to cool to a temperature of about 50° C.

A paste is made by stirring pigmented polyvinyl chloride powder with dibutyl phthalate in a mortar until a smooth paste is obtained. Equal parts by weight of the plasticizer and polyvinyl chloride are convenient proportions, but the flexibility of the result may be increased or decreased as desired by increasing or reducing the amount of plasticizer. Ability to form pastes depends on the type of polyvinyl chloride used, and specially prepared "Corvic" polymer was used in these experiments. The mold is then filled with the polyvinyl chloride paste, possibly tinted in addition to match more closely the skin adjacent to the particular restoration. The flask is secured, replaced in the oven and left for one hour at 140° C. After gelation the flask is removed from the oven and allowed to cool, when the restoration is removed and trimmed.

Cooling Facilities of Rubber Equipment

Proper Use and Maintenance of Such Facilities on Mills, Banburys, Rolls and Tubers Eliminates Trouble Spots and Improves Processing

By T. M. TAYLOR

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PROPER maintenance of rubber processing equipment is a necessary and important phase of production. If management is to maintain maximum over-all production it must allow the engineering and maintenance organization sufficient authority, time and money to keep equipment operating at top efficiency. When the pressure of production jobs that have to be completed "yesterday" interferes repeatedly with repairs that should have been made last week, the chances are very good that a condition will soon exist where the rush job can not be completed until next month. The first rule, then, in maintenance work is, *"Do it now."* A small repair job today may prevent a costly shutdown tomorrow.

In addition to the mechanical difficulties regularly occurring, there are a number of little things that frequently cause production delays and hidden extra costs. One of the most important of these concerns the cooling of mills, Banbury mixers, calender rolls and tubing machines.

Early in the history of the rubber industry, it was learned that some means of carrying off heat occasioned by friction of the stock working on the equipment was necessary. It was learned later that the same facilities could be used to control temperatures within the ranges best suited for a given stock or processing operation. The methods in use today have altered little since the first installations were made—but it is doubtful that full use is always made of the facilities available. In ordinary times this was foolish and expensive. Today it approaches sabotage by interfering with production, increasing the percentage of seconds, and wasting vital raw materials.

Most causes of inadequately cooled processing equipment are obvious and their correction is generally inexpensive and elementary. However, as is often the case, the obvious little things are all too frequently overlooked and unsatisfactory conditions tolerated. It is hoped that by pointing out potential trouble spots and emphasizing both the processing difficulties due to poor cooling and the ease with which they may be corrected much future trouble may be avoided.

Mixing Mills

First, let us look at the rubber mixing mills, one of the first items of processing equipment used in the industry. Fundamentally, there is little difference between the oldest 40-inch mill and the most modern 84-inch mill except for refinements. One of these involves the use of steel rolls because their greater strength permits the use of a thinner shell having faster heat dissipating qualities.

Improper cooling of mill rolls may contribute to the following production problems:

1. Stock too hot to handle conveniently—a potential safety hazard.
2. Poor quality of vulcanized stock due to prolonged exposure to high mixing temperatures.
3. Partially scorched stock.
4. Loss of softener due to vaporization at mixing temperatures.
5. Sticking of stock to mill rolls.
6. Extended mixing cycles due to above and to waiting for mill to cool before starting succeeding batch.

If you have these or other problems that may be due to improper cooling, check the following points:

(1) *Water Supply to Mill:* Is the flow of water to the mill the full capacity of the pipe or are the pipes corroded or full of scale so that there is only a trickle of water?

Solution: Replace piping from main supply to mill using pipes of adequate size.

(2) *Valves:* Are *all* valves in good working order and open? Faulty valves which do not open fully—or even a good valve if it is kept closed—prevent cooling water from doing its job. In open-end mills this can be easily checked. In closed systems, it is more difficult to make sure that the flow of water is unimpeded as it is also necessary to make sure that a valve or fitting in the outlet line does not built up back pressure and restrict the flow of coolant.

Solution: Make sure that all valves—*both inlet and outlet*—are in good working order. Repair or replace faulty valves and keep them open when using the mill.

(3) *Spray Pipes or Water Distributor Pipes:* Have spray pipes been checked to be sure they are functioning properly? One good indication of faulty spray pipes is a mill roll surface cool at the inlet end but progressively hotter as you approach the opposite end.

Solution: Remove spray pipe and either repair or replace it. The spray pipe should be closed off at the end opposite the inlet and should have small holes drilled along its length. It should be installed so that the water will be sprayed against the inner top surface of the rolls to give maximum cooling efficiency.

Note: The author of this article is processing supervisor of the DuPont Rubber Laboratory. He was formerly with the B. F. Goodrich Co. for twenty-three years in charge of factory processing and more recently was in charge of processing for the Electric Hose & Rubber Co. for three years.

(4) *General Overheating:* Does mill heat up rapidly, get too hot during use, or cool down slowly? If the answer is "yes" or if it is impossible to operate 24 hours a day without either running into difficulty or giving the mill a cooling off period, the mill is probably not making full use of the cooling water. Over a period of time deposits of rust and calcium salts from the water build up on the inside of the mill. The foreman in your boiler room or power plant can give you an excellent story of the effectiveness of hard water scale as a heat insulator and the need for keeping the boiler tubes clean. Cooling a mill is the same story in reverse. A deposit of only a fraction of an inch will cut the effectiveness of cooling water in half; and the heavy deposits common in many plants make it impossible for any amount of cooling water circulated to be effective.

Solution: Clean out the mill rolls by means of iron jacks or chemicals.

(a) *Jacks.* Get a supply of about 1½ inch iron jacks from a local foundry. Ten or fifteen pounds of jacks will suffice for an 84-inch mill, with proportionately smaller amounts being used for smaller mill rolls. After disconnecting the water supply pipes, load the jacks into the mill through the water inlet. They may be easily pushed through the mill roll neck with a stick. Now, reconnect the water piping and run the mill with a full flow of water for several hours. In closed systems, it is advisable to have the mill end open during the first few hours to prevent the dirt and scale knocked loose from clogging the outlet pipes and drain. Any jacks remaining in the mill after it is clean will cause no harm but will help prevent scale from building up again as the mill is used.

(b) *Chemicals.* The water cooling system is turned off and mill rolls drained by siphoning. Then a prepared scale remover, such as Duclean No. 2*, diluted according to directions is poured into the rolls. The rolls are then allowed to turn for 30 minutes to 1 hour. The water is then turned on again, the chemical solution and removed scale flushed to the drain, and the mill is ready for use.

Another simple and practical method for removing scale with chemicals is illustrated in Fig. 1. The chemical cleaner is made up in the drum to the desired concentration, making allowances for dilution by the water in the equipment to be cleaned. The cleaner is circulated by the pump while the equipment is operated.

The comments on mixing mills apply generally, but with specific variations, to the other principal pieces of processing equipment in the rubber shop.

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Banbury Mixers

All of the later Banbury Mixers are equipped with spray type cooling of the shells and it is a simple matter to lift the curtain and check the spray nozzles. But it is amazing how often even this precaution is neglected. A regular daily check is advised. A few choked nozzles and cooling efficiency suffers materially. Hence, don't just look. When a spray nozzle is not working properly, take a few minutes to have it cleaned out—or better yet, have spares on hand for prompt replacement. And make the replacement now. The baffles and plates should also be checked regularly and a definite schedule set up for cleaning and scraping away deposits of rust and scale.

Follow the schedule religiously. Scale on the outside of the shell or the inside of the rotors of a Banbury Mixer can reduce cooling efficiency just as it does on the inside of a mill roll. While it is impractical to use jacks in Banbury rotors, scale and calcium deposits may be removed by the use of Duclean No. 2 using the set-up shown in Fig. 1. Be sure to keep the rotors turning while they are being cleaned.

Rotors, ram and slide have flexible hose inlets and generally discharge into an open drain where the flow of water may be easily checked. Most important here is to make sure the hose is not doubled or crimped to reduce the flow. This is particularly true of the slide hose.

Tubing Machines

Tubing machines are an important potential source of production delay and scorched stock. Although a hot die improves the surface appearance of most extruded goods, for general purposes the tubing machine should operate with as little heat as possible up to the extrusion point.

Most tubers have jacketed barrels and cored worms for cooling. Jacket temperatures can be readily determined, and if a definite increase between inlet and outlet water temperatures does not prevail, it is probably wise to clean out the jacket with the chemical cleaning solution.

As the worm heats even more rapidly than the barrel, it is essential that it be clean and that good water circulation be maintained if you are to avoid trouble. In addition to cleaning the core of the worm chemically and checking the flow of water it is also necessary to be sure that the water is going where it will do the most good. A water distributor pipe should be attached to the inlet to carry the water to the front end of the cored worm. If this pipe is badly corroded or broken off near the inlet, the cooling water will not circulate throughout the full length of the worm and bad overheating will result. If extruded stock is rough or scorches on long tubing runs, check all cooling facilities promptly.

Calenders

While cooling of calender rolls is important, close control of roll temperatures is a major factor in achieving a good calender job. For best results, definite roll surface temperatures, depending upon the stock used and the calendering operation, are maintained by adjusting the flow of water or steam to the rolls. When the insides of calender rolls are covered with rust and

scale and spray pipes are broken or clogged it is difficult and often impossible to maintain the desired roll surface temperatures. In addition, slower cooling or heating resulting from poor maintenance causes wasted time and lost production while waiting for the calender to reach the proper temperature when changing from one stock or calendering operation to another.

The length of time it takes to heat up or cool down the calender when it is in good operating condition (with clean rolls, good spray pipes, and all pipes and valves functioning properly) should be known. This can be made a matter of definite information by use of a surface pyrometer, keeping the rolls in motion while heating or cooling to avoid a lopsided temperature condition. Then the next time trouble occurs you will be able to tell whether or not some fault in the calender cooling system is causing the difficulty.

Calender cooling systems may be maintained in much the same manner as mixing mill rolls. However, the rolls should be kept separated or cushioned with gum during the cleaning operation to avoid injury to the smooth machined surfaces.

It should be remembered at all times that a calender is essentially a delicate machine for fine finishing and for producing work within close tolerances. Rough surfaces due to pitting, dirt or a built-up crust of a rough material like water glass, sometimes used to prevent sticking, makes a good calender job that much more difficult to obtain.

Keep the roll surfaces clean and smooth. If the calender is to be shut down for several hours don't let cold water run through the rolls. In fact, after a cold calender run, heat the rolls a little with steam before shutting down. This will prevent moisture in the air from condensing on the surface and causing rust. If the calender is to be down for several days, coat the roll surfaces with a light oil to prevent rust. It can be easily removed with a rag and by running a little scrap stock through the calender just prior to use.

If the roll surfaces are fouled with dirt, make up a 30-70 mixture of gum and fine (20 to 30 mesh) abrasive powder such as carborundum. Let the cold calender run at odd speed on this for an hour or two and see what a clean, polished surface results. What is of greater importance, you will produce better looking calendered goods with less effort. Naturally a treatment of this sort will not correct warped, egg-shaped or improperly crowned calender rolls. Only new rolls or a first class grinding job will rectify these troubles.

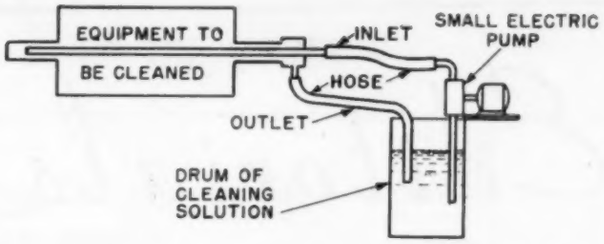


Fig. 1—A typical set-up for cleaning scale chemically from the internal surfaces of mill rolls, Banbury rotors, and jackets and screws of tubing machines.

The importance of processing stocks at low temperatures was recognized with crude rubber; with the widespread use of synthetic this need has been greatly emphasized. Synthetic stocks are generally more scorchy than natural rubber stocks and their processing temperatures are more critical. Further, the art of working away or reclaiming spoiled or partially pre-cured synthetic stocks has not been developed to nearly the extent that it was with crude. The preferred solution is to maintain processing equipment cooling facilities to keep spoilage to a minimum.

It may not be possible at this time to install air conditioned rooms or a refrigerated water supply, but if experience is any criterion, remarkable improvement may be attained by seeing that present facilities are functioning at their best.

Changing Belt Speeds Calls for Caution by Operator

A SERIOUS accident occurred in a rubber factory recently, in which a machine operator was seriously injured when he attempted to shift a belt. On the machine on which this accident occurred it was at times necessary to change the speed of the machine. This was done by shifting the belt from one pulley to another, like changing the speeds on the old type belt-driven engine lathes.

Heretofore the shifting of the belt had usually been done by maintenance men. However, due to the shortage of help, the plant had been permitting machine operators to make their own belt speed changes. In order to shift this belt it was necessary to remove the guard. The injured man removed the guard and reached through the belt above the pulley with his left arm.

With the aid of a half-inch piece of metal he attempted to pull the belt off the pulley. There was an opening in the belt where it was spliced, and naturally the bar caught in this opening and pulled his left arm down into the bite between the belt and the pulley. His arm went around the pulley and his side also struck the pulley, fracturing five ribs and causing other internal injuries. He also sustained a fractured left leg, possibly a skull fracture, comminuted fracture of the left lower arm and comminuted fracture of the left upper arm. It is questionable whether or not the man will survive his serious injuries.

Since this accident occurred a permanent irremovable guard has been installed around the pulleys, and in addition a permanent method of belt shifting will be installed. So far as the belts are concerned, particular attention will be paid to all belts on all machines to bring the ends as close together as possible.

Safety News Letter

Editorials . . . . . .

Plant Disposal

THE invasion of Borneo proper by Australian troops under the command of General MacArthur practically assures the early receipt of some appreciable quantities of natural rubber. At this writing the Australian troops have virtually cleared Labuan Island, which lies at the mouth of the Brunei Bay area of North Borneo. This is a heavily-laden rubber area and contributed a good portion of the total amount of rubber secured from Borneo in the prewar period. Labuan Island itself is strewn with rubber plantations. That Washington officialdom expects the early resumption of shipments of natural rubber from the Far East shortly is indicated in its decision to turn back the distribution of natural rubber in the United States to regular trade channels by appointing the Rubber Trade Association of New York as its distributing agent.

Although it will be some time before any heavy shipments of natural rubber are received from the Far East, any shipments at all will be a welcome relief and will do much to bolster the steadily dwindling stockpile in this country which dropped below the 100,000 ton danger point by the end of last year and which, it is predicted, will drop to approximately 50,000 tons by the end of this year unless it is augmented by new deliveries from the Far East. No matter how much natural rubber is secured from this area during the current year and all of next year, the synthetic rubber facilities in the United States will still have to be operated at near capacity to fill military and essential civilian needs. Should the war with Japan end abruptly the full capacity of the synthetic rubber plants and the natural rubber plantations would be needed to supply a rubber-hungry world.

However, now that actual supplies of natural rubber from the Far East seem assured, and with all military signs pointing toward a reasonably early invasion of Malaya and Sumatra, the really heavy rubber-producing areas, considerable attention is being paid to the eventual disposition of the synthetic rubber plants in the United States. This problem is one which rises with the tides and fortunes of the war. It must eventually be solved and in its solution will lie the fate of the war-grown synthetic rubber industry in the postwar period.

Four possible solutions were recently outlined by Dr. E. R. Gilliland, former Assistant Rubber Director, in accepting the Leo Hendrik Baekeland Award from the North Jersey Section of the American Chemical Society. These were: (1) Transition from the present government set-up to one that is self-sustaining, under government operation; (2) Continue operations as at present; (3) Lease the plants to industry for a period of five years, at the end of which the true value of the plants would be determined; and (4) Outright sale of the plants to private industry.

As Dr. Gilliland pointed out, each one of these suggestions has definite problems. If the government attempted to change over to a self-sustaining basis it would have to establish large research and development groups in order to improve the operations and the polymers and thus avoid early obsolescence of the plants. If operations were continued as at present it would raise the question as to whether the companies would be willing to continue in their capacity as supervisors and operators once the emergency was passed, while questions of taxes, amortization and other charges would develop. If the plants were leased to industry over a five-year period it is doubtful whether the operators would make improvements involving capital expenditures until such time as they were assured on final disposition of the plants.

Although the last method, sale to private industry, also offers major problems, it seems to be the most desirable of any offered to date. There are two major viewpoints on this proposal: (1) Synthetic rubber plants, like aircraft, warships or other military armament, are purely a war necessity and the government should make no attempt to recover its full investment value, figured at approximately $850,000,000; (2) The synthetic rubber plants represent a going industry with possibilities of profitable operation after the war and should be disposed of as such.

This much is certain: Companies now operating the synthetic plants will not be interested in the purchase of such plants at prices which are a high percentage of the investment. It must be remembered that a number of the plants were built under high pressure and under peculiar emergency conditions and could not only be duplicated but considerably improved today at lower cost. Industry itself will make no move to build new, high-yield, low-cost plants, even though such a move is highly desirable, until such time as the government reaches some decision on the existing plants. Therefore, in order to guarantee the continued existence of a synthetic rubber industry in the United States, official decision on the disposition of the present synthetic rubber plants should be made at the earliest possible moment.

CARBON BLACK LIMITATIONS ARE LIFTED AS CHANGES ARE MADE IN RUBBER ORDER

REFLECTING the improvement in the supply of carbon black, the annual production rate of which is expected to reach the scheduled 1,200,000,000 pounds shortly, the War Production Board on May 30 announced the removal of limitations on the use of carbon black in tires, tubes and other rubber products, effective June 15. At the same time, control over the production of inner tubes for truck tires was tightened to assure that military demands would be met, production of garden hose was stopped until June 30 because of a shortage of fabrics, and the ban on the manufacture of golf balls was lifted. These changes were incorporated in a revision of Rubber Order R-1, now officially termed Rubber Order R-1, as Amended May 30, 1945, and in revisions of Appendices I and II of that order. To officially complete the changes, Appendix III to Rubber Order R-1, as Amended April 6, 1945, was revoked, as were Directions 1, 4, 6, 9, 11 and 12 of the order.

Under the new regulations carbon black may now be used in various products to the amounts permitted prior to February 10th of this year when the restrictions were imposed to conserve carbon black, then in extremely short supply. Although there is not yet sufficient carbon black to make as many tires as are needed, production of this component now is keeping pace with present output of tires, according to the WPB Rubber Bureau.

(EDITOR'S NOTE: Fred M. Vinson, Director of War Mobilization and Reconversion, announced on June 8 that all restrictions on the use of carbon black had been lifted and that the Special Inter-Agency Committee on Carbon Black, headed by Michael J. Deutch, had been disbanded. He disclosed that coordinated efforts had increased the output of carbon black by 43%. He also stated that DSC and OPA will discontinue their so-called "enrichment program.").

New Inner Tube Regulation

Tightening of control over truck inner tubes was instituted to correct uneven distribution of the available supplies. Percentages for the balance of the current quarter, based on adjusted tire production estimates, are as follows: Group A (large truck sizes)—73% military and 27% non-military; Group B (medium sizes)—84% and 16%, respectively; and Group C (light delivery sizes)—60% and 40%, respectively.

All sizes of inner tubes for ground vehicles, both military and civilian, and all airplane tubes, except a few special sizes, are being made of synthetic rubber. The airplane and military and larger sizes of civilian truck tubes are made of Butyl while the small truck and passenger car tubes, as well as those for farm tractors, are made of GR-S.

The new golf balls will be made with neoprene thread and a GR-S core, while the cover will be of balata as in the past. According to the Rubber Bureau, supplies of the new golf balls will be limited since production has been scheduled at 224,000 dozen a quarter, of which about 130,000 dozen will be available for civilians. For several months the Armed Forces and the Veterans Administration have been receiving small amounts of new balls for rehabilitation programs.

Other revisions of the Rubber Order include a change in terminology. "Natural rubber" is now used to designate all forms and types of tree, vine or shrub rubber, including guayule and natural rubber latex. The term "crude," which former usage restricted to natural rubber, now embraces all unprocessed rubber, including synthetic. The order makes it clear that the word "Buna" is no longer to be used as a term describing any type of American made synthetic rubber. "Buna S" will hereafter be referred to only as GR-S, while "Buna N" will be referred to as butadiene-acrylonitrile. The new order also prohibits the destruction or damaging of tires, tubes and miscellaneous scrap rubber in the interests of conservation.

Production Problems Outlined

The specific production problems facing the rubber industry were discussed by and an outline of one-front war requirements given to members of the recently-organized Rubber Industry Advisory Committee by WPB officials at a meeting held in Washington on May 31. The industry was warned that far from worrying about reconversion it must buckle down to an even bigger production job in order to meet military and essential civilian needs.

It was pointed out at the meeting that drastically screened requirements call for 5,347,000 heavy-duty truck tires in the third quarter of this year, which is 8% more than projected production of the industry which is still faced with manpower shortages in spite of some general easing of labor over the country. In the top-size tires—large truck and so-called high-flotation types—the deficiency will be 19%. Included in the screened requirements for the next six months are substantially more truck and bus tires for civilian use than have been allotted in any similar period since Pearl Harbor.

It was also brought out at the meeting that present plans call for at least four new tires for the new passenger cars to be built in 1945. Final determination will depend on the supply and demand situation in the fourth quarter of the year. Production schedules for passenger car tires will continue below rock bottom needs this year because of the millitary and essential civilian demand for large truck and bus tires.

22,000,000 Tires Minimum Need

According to a recent survey made by the industry at the request of the Rubber Bureau, there is a minimum replacement need of 22,000,000 passenger car tires this year. A production program of 20,000,000 units for replacement purposes is on the books and to this will be added 800,000 units for equipping the 200,000 new cars scheduled to be built in the last quarter of the year. According to tire officials, a maximum of 25,500,000 replacement tires are needed in 1945.

Plans for alleviating the manpower shortage in the rubber industry were discussed at the meeting, but no specific conclusions were reached. Tire and tube manufacturers were said to be short about 5,000 workers and are slated to lose 1,800 former soldiers who have been working in such plants. Approximately 3,500 men and women are needed in the textile plants making cotton tire cord, 800 are needed to obtain maximum production on rayon tire cord (one of the current major bottlenecks), and 450 men are needed by the reclaim rubber industry. Except for rayon tire cord and other textile components, there are sufficient other major materials to support a higher tire production rate, according to John L. Collyer, Special Director of Rubber Programs, who presided at the meeting.

At one point during the discussion, Mr. Collyer emphasized the need to use synthetic rubber in still more products. Admitting that technical men already have done a tremendous job in mastering the problems raised by such conversion, Mr. Collyer said that more must be done to expand the nation's dwindling stockpile of natural rubber.

Members of the Rubber Industry Advisory Committee, all of whom were present at the meeting except Mr. Robins, are: Charles H. Baker (Goodyear Footwear), Earl Bunting (O'Sullivan Rubber), George B. Dryden (Dryden Rubber), Harvey Firestone (Firestone), A. L. Freedlander (Dayton Rubber), F. D. Hendrickson (American Hard Rubber), Howard W. Jordan (Pennsylvania Rubber), F. Thatcher Lane (Seamless Rubber), Thomas Robins, Jr. (Hewitt Rubber), P. W. Litchfield (Goodyear), Jean H. Nesbitt (U. S. Rubber Reclaiming), William O'Neil (General Tire), J. P. Seiberling (Seiberling Rubber), Herbert E. Smith (U. S. Rubber), J. Newton Smith (Boston Woven Hose), F. F. Sommers (Rainfair), and James A. Walsh (Armstrong Rubber).

In commenting on the organization of the Rubber Industry Advisory Committee, A. L. Viles, president of the Rubber Manufacturers Association, pointed out that the committee members were selected from top-bracket personnel representing all of the different divisions of the industry and stated that these members will be of assistance in guiding and advising the WPB Rubber Bureau during period one of the Pacific war and after V-J Day in the later period of reconversion to peacetime production. On a broader scale, he said, the Committee will supplement the work of the industry's seventeen technical committees which have assisted the Rubber Bureau in converting end products to synthetic rubber under pressure.

Rubber Chemicals Situation

Requirements for various type of accelerators and antioxidants, substitution possibilities, and the availability of raw materials, were discussed last month by WPB officials with the also recently-organized Rubber Accelerator and Antioxidant Industry Advisory Committee. The committee was informed that additional production of accelerators and antioxidants will be necessary this year to meet the expanded rubber program. A statistical survey is currently being made of the supply and requirements of such materials for the remainder of 1945 and the first half of 1946.

The most serious shortage of accelerators is that of aromatic thiazoles, and expanded production of this class of accelerators will be required, inasmuch as a shortage of from 3,000,000 to 4,000,000 pounds is estimated for this year. Of the antioxidants, secondary diamines, secondary monoamines, tertiary monoamines, and ketones with secondary amines are in most critical supply. Manpower difficulties are currently interfering with the production of intermediate products derived from benzene, the raw material used in the largest quantity in rubber chemicals, with aniline in the tightest supply.

Other factors brought out at the meeting included these: A new plant for the production of amines, expected to come into operation in July, will overcome the present amine shortage; the sodium cyanide shortage is expected to remain critical until the end of the summer; peroxide supplies have grown progressively tighter; it will be difficult to meet the large increased requirements for methyl ethyl ketone for the increased rubber program; additional facilities for the production of naphthalene are expected to come into operation soon; the supply of hydroquinone, now under allocation, has improved somewhat; supplies of salicylic and acid have tightened, but no serious problem has developed; and phthalic anhydride continues in critically short supply.

In discussing future requirements for rubber chemicals, Rubber Bureau officials pointed out that there is a distinct trend away from the use of mixtures of synthetic and natural rubber and a definite shift towards totally synthetic compounds. This change will be reflected in the current supply and requirements survey being made.

Members of the Rubber Accelerator and Antioxidant Industry Advisory Committee include the following: R. E. Casey (Naugatuck Chemical), H. I. Cramer (Sharples Chemicals), W. C. Harmon, Jr. (Calco Chemical), O. M. Hayden (DuPont), B. W. Henderson (American Cyanamid), J. P. Maider (Goodyear), H. A. Morton (Chemico), W. S. Richardson (Goodrich), and R. L. Sibley (Monsanto).

Status of Fire Hose

Production of cotton rubber-lined fire hose cannot be stepped up to meet increased military requirements in full in the last half of 1945 unless additional cotton yarn and manpower can be made available to the industry, members of the Fire Hose Manufacturers Industry Advisory Committee informed WPB recently, according to a report issued on June 2.

Stated requirements for single and double-jacket cotton rubber-lined fire hose for all purposes in 1945 total 86,000,000 feet (figured in terms of single-jacket hose), of which a major portion has been requested by the Army and Navy, WPB representatives reported. They pointed out, however, that the amount of cotton yarn expected to be made available for 1945 production will be sufficient to make only 62,000,000 feet. Though several manufacturers in the industry still are able to operate on a three-shift basis, others are on a two- or one-shift basis, principally because of the shortage of yarn and manpower.

Military demands for hose of the double-jacket type in particular have increased, it was reported by WPB officials. Since hose of this type requires considerably more yarn than single-jacket hose, committee members suggested that the armed forces make every effort to use single-jacket hose wherever possible. They also suggested the possibility of using hose in twill or other special weaves that are not described in Federal specifications. This might enable some manufacturers to increase production by resuming use of looms that are now idle, industry members explained.

Tire Expansion Cutbacks

Emphasizing the fact that requirements for truck and bus tires as submitted to the Rubber Bureau since V-E Day still are substantially higher than production, officials of the Bureau admitted on May 24 that some tire capacity expansion in the small truck size groups authorized last December and January had already been cancelled. The statement was made on the occasion of a meeting held in Washington between WPB officials and international officers of the United Rubber Workers of America.

(EDITOR'S NOTE: Mohawk Rubber has since announced that it has dropped all plans to operate a DPC tire plant at Chattanooga, Tenn.).

At the same time it was revealed that there has been a cancellation of every bogie wheel expansion project previously authorized. Such cancellation was attributed to the fact that the Army's requirements for bogie wheels have been substantially reduced in keeping with the general military cutback of the tank production program. Contracts for bogie wheel expansion units had been placed with Goodyear, Goodrich, Dayton Rubber, Firestone and Pharis Tire.

Rubber Bureau officials also stated that the rate of tire production in March was the highest ever achieved, reaching a rate of 5,632,000 bus and truck tires for the quarter. In May, however, the quarterly production rate fell to 4,767,000, a reduction of 15%. Therefore, it was pointed out, in order to meet third quarter screened requirements, the rate must be increased by 11% over that of March.

Ample Synthetic Supply

Reports from Washington indicate that there has been a definite shift from production of large, heavy-duty tires to smaller sizes, and the demand for synthetic rubber dropped 10% from April 15 to May 15. While part of this decline is attributed to work stoppages, the major share of the reduction was due to the shift to smaller size tires. Further indications of reduced use of synthetic rubber for miiltary tires stems from the fact that bead wire for these tires is beginning to pile up for the first time in years. Empty reels are not being returned in the same volume as formerly.

Enough synthetic rubber is currently being produced to fill all available tire production capacity. Synthetic production in the first four months of 1945 amounted to 296,000 tons, but this rate has not been sustained due to the inability of the industry to absorb production. Supplies of natural rubber remain in poor condition and WPB plans are said not to include the possibility of any such rubber from the Far East this year.

An indication of the improved synthetic rubber picture was the announcement by WPB on May 24 of another one-month "liquor holiday" for July, during which American distillers will pro-

duce approximately 50,000,000 proof gallons of beverage spirits. Officially WPB explained that the "holiday" was made possible by increasing use of petroleum instead of industrial alcohol in the manufacture of butadiene and suspension of shipments of industrial alcohol to Russia. The stockpile of alcohol was also an influencing factor, amounting to 68,000,000 gallons on May 1 against an estimated amount of only 36,000,000 gallons.

Seize Yarn Manufacturing Plant

That the war department is making every effort to break the tire cord bottleneck was emphasized on May 20, when President Harry S. Truman ordered the Quartermaster Corps to take over and operate the Cocker Machine & Foundry Co., of Gastonia, N. C. The take-over was authorized on the grounds that a strike in the plant was restricting production of textile machinery vitally needed for the manufacture of tire fabrics.

Industrial Rayon Corp., in announcing first quarter earnings on May 18, stated that full production of tire yarn at its Painesville, Ohio, plant would be reached late in May, and that the rate of labor recruitment had already permitted substantially increased operation of facilities for the conversion of yarn into tire cord and fabric.

GUAYULE CROP WILL BE HARVESTED WITHIN NEXT TWO YEARS

To meet a critical shortage which makes it necessary to consider natural rubber in pounds, not tons, from now on, all the guayule crop in the continental United States will be harvested and processed within the next two years, according to an announcement made by Special Rubber Director Collyer on May 15. This action, which is expected to yield 12,000 long tons of guayule rubber, was recommended by a special committee, headed by Dr. H. L. Trumbull (Goodrich) and including Dr. John McGavack (U. S. Rubber), Dr. C. E. Bradley (U. S. Rubber), and John Ingle (Goodyear).

In making the announcement, Mr. Collyer pointed out that our stockpile of natural rubber is in the danger zone due to the demand for large combat, airplane and bus, truck and implement tires. At the end of 1944, the stockpile amounted to 95,000 tons and it is expected to fall to 55,000 tons by the end of the current year. By contrast, the natural rubber supply in 1942 was more than 600,000 long tons.

Following a suggestion made by the special committee, four new guayule rubber processing units will be built to turn out maximum tonnage by April, 1947. Present plans call for two of the new plants at Bakersfield, Calif., and the other two at Patterson, Calif. The sites were said to have been chosen to obtain the most efficient use of manpower and construction materials. The Rubber Reserve Company has contracted with the Firestone Tire & Rubber Company to construct and operate the mills. It is understood that the plants will cost $300,000 each and will be built with DPC funds.

Status of Guayule Bill

The guayule rubber bill (HR-2347), also known as the Poage Bill, designed to make the cultivation of guayule a post-war agricultural project in the southwest, is awaiting action by the Senate at this writing (June 7). The bill, which was given legislative right of way with one hour's debate by the House Rules Committee on May 4th, passed the House of Representatives on May 14. Introduced by Rep. Poage of Texas on February 26, it was reported favorably by the House Committee on Agriculture on March 28.

Under the terms of the guayule bill, cultivation of the guayule shrub up to 400,000 acres would be encouraged by the government. A price of 28c per pound would be assured at the mill for "processed cured guayule rubber for shrub harvested before June 30, 1956." The bill also provides that 40,000 acres is the limit of harvesting for any one year insofar as the floor price of 28c a pound is concerned.

Statement on Far East

Although the Malayan Peninsula and Borneo will be able to ship natural rubber soon after those areas are liberated from the Japanese, exports of natural rubber from the Far East to the United States are not expected to reach an annual total of 1,600,000 tons for four years, according to a recent statement made by Herbert E. Smith, president of the U. S. Rubber Company. Only 350,000 tons of natural rubber can be expected in the first year after liberation, he said, and no more than 900,000 tons in the second.

Although little information concerning the condition of its own plantations is in the hands of U. S. Rubber, Mr. Smith was of the opinion that the Japanese will have neither the time nor the manpower to destroy individual trees and major damage will result from the fact that the trees will suffer from lack of care needed to keep down undergrowth, to curb disease, and to check fires in dry season. The lack of such care will probably result in a decline of 30% in the production of the natural rubber trees.

Mr. Smith added that in all probability the natives of the Far East have nurtured their own holdings. Reports have been received from French Indo-China to the effect that the Japanese have continued the cultivation of rubber in that territory.

Borneo Shipments Anticipated

Based on the belief that the Allied drive will continue as anticipated, crude rubber importers in New York are predicting that crude rubber will again become available for export from Dutch Borneo by the end of the year while shipments from the other islands in the Netherlands East Indies may well commence in limited volume during the first part of 1946.

Businessmen familiar with the Indies claim that the natives probably have hidden considerable quantities of such commodities as rubber and although the Japanese will probably carry away or completely destroy the equipment of the large plantations, it is likely that the natives will retain sufficient tools to begin immediate production on a moderate scale.

Borneo has approximately 10% of the world area planted to rubber, some 923,000 acres. In the first 11 months of 1941, Borneo shipped about 166,000 long tons and since it is estimated that approximately 10% of the full potential of any liberated area will be produced and shipped in the first year following liberation, the first year's output from Borneo should amount to about 20,000 tons.

According to a recent statement issued by the Trade Commissioner for the Netherlands Indies, the procurement of rubber tapping equipment in the United States is progressing satisfactorily. These tools will be equally distributed between native growers and the plantations which are managed by Western peoples. The eventual cost of natural rubber, he said, is expected to be substantially reduced by greater selectivity in tree planting and tapping, as well as in higher over-all production.

French Are Again Active

That the rubber officials of the French Government have resumed international relationships was indicated by an announcement made on June 5 by the French Ministry of Information that such officials recently discussed the overall rubber supply situation with British rubber experts in London.

The French and British delegates are said to have discussed the future of the rubber industry, particularly in Indo-China where it is believed that plantations have suffered but slight material losses from the war. Rubber plantations which were evenly distributed over the whole of Indo-China are reported to be practically intact.

Rubber production in Indo-China experienced a boom immediately before the war. Production increased from 6,000 tons in 1925 to 58,000 tons in 1938 and under normal circumstances could have reached 115,000 tons in 1945. For this reason the French rubber experts expressed extreme optimism concerning the future of Indo-China's rubber industry.

British Report on Kok-Saghyz

Experimental cultivation in England of kok-saghyz grown from seeds sent

by the Soviet Union has yielded rubber "nearly as good as plantation rubber," according to the annual report of the Imperial Institute. The seeds were originally distributed by the Royal Botanic Gardens, Kew, and the experimental work was directed by the London Advisory Committee for Rubber Research (Ceylon and Malaya). The plants were harvested and submitted to the Imperial Institute for detailed examination of quality and for study as to methods of extraction.

According to the report, the dry roots contained, on an average, up to 10% of rubber. Although the quality was found to be near that of plantation rubber, the yield per acre is much smaller than such rubber and the cost of production much higher. The report concludes that "in spite of the rubber shortage, labor and good agricultural land could not be spared in Great Britain to grow the crop on an extensive scale."

Argentine Deal Reported

Reports from Buenos Aires on May 2 indicated that Argentina has signed a rubber agreement with the United States and Brazil under which that country's urgent rubber needs will soon be supplied. It is presumed that the United States will permit a deviation of its contract with Brazil to acquire all of that country's natural rubber over and above its own requirements to enable Brazil to make direct shipments of rubber to Argentina.

RUBBER TRADE ASSOCIATION TO DISTRIBUTE NATURAL RUBBER

The Rubber Trade Association of New York, Inc., which maintains headquarters at 15 William Street, New York 5, N. Y., has been appointed by the Rubber Reserve Co. as its "Distributing Agent," as of June 1. The Association will perform all functions heretofore performed by D. D. Haldane as Distributing Agent for Rubber Reserve in connection with the handling and distribution of importations of natural rubber. The same distribution procedure applies. It is emphasized that natural rubber only is involved in the agreement, and distribution of the synthetic rubbers will continue to be handled by the Sales Division of the Rubber Reserve Co. at Washington.

The purpose of the change is to provide for the augmentation of the present facilities for handling the increased volume of natural rubber importations which may be expected as a consequence of the reoccupation and rehabilitation of certain Far Eastern rubber producing areas and also to provide for the re-establishment of normal trade channels for handling natural rubber importations after the war. The appointment was covered in Circular No. 41, issued by Rubber Reserve on May 29.

According to the announcement, Mr. Haldane will continue to serve as a governmental employee with the designation of "Special Representative" for Rubber Reserve. In this capacity he will continue to select the grades of natural rubber to be distributed to various purchasers, this being deemed a function which should be exercised by the government directly. Accordingly, all inquiries pertaining to the selection of grades of rubber for distribution purposes should be referred to the "Special Representative," whose address is the same as that of the "Distributing Agent," and all other inquiries pertaining to the distribution of natural rubber should be addressed to Rubber Trade Association of New York, Inc., Distributing Agent, Rubber Reserve Co., 15 William St., New York 5, N. Y.

Experimental GR-S Latices

A procedure for the distribution of experimental GR-S latices has been established by Rubber Reserve. The procedure, covered in Circular No. 42, issued on June 1, provides that all shipments of such latices will be made upon the condition that both the consumer and the distributor agree to furnish Rubber Reserve with a report stating in what respects, if any, the experimental latex was found to be superior or inferior to regular GR-S latices. If the information appears to be of general interest, it will be made available to all latex consumers and distributors.

Requests for permission to purchase experimental GR-S latices for manufacturing purposes must be submitted in duplicate to the sales division of Rubber Reserve in accordance with regular purchasing procedure. This procedure, however, is unnecessary in connection with the purchase of quantities not exceeding 250 pounds (total dry latex solids) in any one month of any such latex for experimental purposes. Such purchases may be made upon direct application from any of the authorized distributors.

The initial production of an experimental GR-S latex will be sold at 18½c a pound in tank car lots, 25c in drum lots, and 31c in less than drum lots, these prices being subject to the addition of uniform freight charges. These prices are subject to change if Rubber Reserve elects to produce additional quantities of an experimental lot. The following experimental latices are now available:

GR-S Latex X-160: This latex is similar to Latex Type 3, having a solids content of 38 to 40%. It is said to be more stable and has a modified rosin soap as the polymerization emulsion. It contains a non-discoloring short-stopper.

GR-S Latex X-182: This latex has exactly the same formulations and properties as Latex Type 3, but is made at higher total solids concentration. The range is from 42 to 44% total solids.

GR-S Latex X-205: This latex has the same monomer ratios as Latex Type 3, but is made with a special fatty acid soap and has a concentration of 29 to 31% total solids.

Off-Specification GR-M

According to an announcement by Rubber Reserve, issued on May 5, it has a certain amount of Grade A Off-Specification GR-M—finished material which in the process of manufacture has become slightly contaminated with fine particles of foreign matter—available for immediate distribution at a price of 20c per pound, plus the applicable uniform freight charge. GR-S plant clean-up, which consists of crumbs which have dropped on the floor, either inside or outside of the driers or have been diverted otherwise from the usual manufacturing channels, is also available at 16.65c per pound, plus the applicable uniform freight charge.

WPB will entertain requests for permission to consume these materials in the manufacture of articles for which regular GR-M and GR-S may not now be consumed under the provisions of Appendix I of Rubber Order R-1 of November 9, 1944, as amended. Such requests should be submitted to WPB on Form WPB-2242.

Manufacturers desiring up to 200 pounds of either of these materials for experimental purposes may obtain purchase permits by addressing the Sales Division, Rubber Reserve Co., 811 Vermont Ave., N.W., Washington 25, D. C.

Note on GR-M-10

Circular No. 40, issued by Rubber Reserve on May 14, calls attention to the fact that GR-M-10, which is available for limited distribution at the established price for standard GR-M, contains a discoloring antioxidant which makes it unsuitable for use in light-colored stocks which would be impaired by discoloration. Therefore, owing to the similarity in appearance between the standard GR-M and GR-M-10, Rubber Reserve suggests that care should be taken by purchasers of GR-M-10 to segregate it for inventory identification purposes.

Other regulations of direct interest to the rubber industry issued by various government agencies in recent weeks include the following:

COTTON DUCK

In order to increase the amount of chafer fabric for tires, Conservation Order M-91 (Cotton Duck) was amended on June 1. The amendment eliminates all automatic authorizations for chafer fabrics on end use certification and in the future chafer fabrics can be obtained only on specific authorization after application on Form WPB-678. The amendment also covers similar procedure on belting hose and duck. Form WPB-678 must be filed with the Textiles, Clothing and Leather Bureau, WPB, Washington 25, D. C. Certifications of end use may continue to be used, however, for numbered duck, filter duck or filter twill to be used for special filter purposes.

STATEX

• A COLUMBIAN COLLOID •

COLUMBIAN CARBON CO.
MANUFACTURER

BINNEY & SMITH CO.
DISTRIBUTOR

Now

INCREASED SUPPLY

The output of Statex-93 has been substantially increased. Shipments now are being made from our large new plant in Texas.

We are gratified that we can contribute in this way to further the rubber industry's effort to supply the demand for quality tires.

•

The contribution of Statex is complete.

In **TIRES** *road service tells the story.*

•

MICRONEX

For 30 years—The Standard Reinforcing Carbon

FURNEX

The High Resilience Carbon

COLUMBIAN CARBON CO.
MANUFACTURER

BINNEY & SMITH CO.
DISTRIBUTOR

The amended order also directs producers of cotton duck to operate looms on hose and belting duck and chafer fabrics as many hours as any other looms in the plant. This requirement is in addition to the one requiring the operation of Army duck, numbered duck, flat duck, and shelter tent duck looms for the same number of hours as any other looms in the plant. In effect, this regulation will provide for the maximum operation of hose and belting duck and chafer fabric looms needed to offset current production deficits of such materials.

BOOTS AND SHOES

Ration rules covering men's rubber boots and rubber work shoes acquired for export or actually exported to a foreign country have been tightened by Amendment No. 17 to Ration Order 6A (Men's Rubber Boots and Rubber Work Shoes). Issued on April 23 and effective April 25, the amendment provides that only a government agency may obtain rationed rubber footwear for export purposes without a ration certificate. Formerly, no one needed a certificate if the rubber footwear was acquired for export.

The amendment also contains two other provisions. One permits OPA district offices to make temporary loans of rubber footwear certificates, rather than permanent inventory increases, to dealers whose business conditions temporarily require a larger inventory. The other allows OPA district offices to exchange several single certificates for one multiple certificate.

Export restrictions of FEA were also clarified by the amendment. Dealers may continue to export rationed rubber footwear without certificates, but they must obtain individual export licenses from FEA. Licenses are not required for exports to Canada or to an Army or Fleet post office address. A dealer who has exported rubber footwear may get replacements by applying to his OPA district office for a replacement certificate.

MISCELLANEOUS ORDERS

In addition to the foregoing, the following recent regulations are of interest to the rubber industry:

Producers requesting allocations of phosphate and phthalate plasticizers for insulation of wire and cable are now required to specify the type of wire for which the material is required, according to amendments issued on May 3 to Schedule 61 (phosphate plasticizers) and Schedule 63 (phthalate plasticizers) of Order M-300.

Maximum prices for sales of cemented patches and uncemented liners made from scrap material when sold to jobbers, retailers and vulcanizers and when sold at retail have been established in Order 27 to R.M.P.R. 131 (Camelback and Tire and Tube Repair Materials). The order was issued on April 12 and became effective April 13.

Prices for three new brands of bicycle tires, each brand having standard, deluxe and motor bike types, all made by the Pharis Tire & Rubber Co., were established in Amendment No. 8 to M.P.R. 435 (Bicycle Tires and Tubes), issued by OPA on April 18. The amendment also authorized prices for certain types having additional sizes.

Increases in some producers' ceiling prices for pine tar, pine tar oil, pine oil, turpentine, dipentine, pitch and similar products will be authorized, according to an OPA announcement of May 24. Permission for such adjustments was provided by amendments to the regulations covering these naval stores products, M.P.R. Nos. 446, 179, 431 and the G.M.P.R.

Allocation controls over allyl chloride, allyl alcohol, anhydrous aluminum chloride, and furfural, used in the production of synthetic rubbers and resins, were removed by WPB on June 1.

Crude scale and refined paraffin wax has been placed under the allocation control of Schedule 108 of Order M-300, the general chemicals allocation order. The initial allocation date is July 1 and allocation is on a monthly basis.

Five different sizes of new and used pneumatic Army life rafts now being offered for sale in civilian channels—covering one, three, five, six and seven-man rafts—have been given wholesale and retail ceiling prices by OPA. The prices are contained in Revised Order 22 to Supplementary Order 94 of G.M.P.R.

Sun Rubber Co., Barberton, Ohio, took top safety honors in Barberton's 1944 industrial safety campaign, with fewer accidents and fewer man-hours lost in proportion to the number of its employees than any other participant.

A luminous tape produced by the Continental Lithographing Co. is being used by the armed forces for blazing trails through the jungles, outlining doorways and cargo hatches of ships being loaded or unloaded at night, and for identification markers. Goodyear's new Vitafilm is utilized in the production of this tape.

Parkersburg Products Co., Parkersburg, W. Va., a subsidiary of the Pharis Tire & Rubber Co., Newark, Ohio, expects to treble its production of rubberized pneumatic lifting bags, which are used in aircraft salvage, and of fuel cells.

Despatch Oven Co., Minneapolis, Minn., producers of industrial ovens and furnaces, has opened a new sales and field engineering office at 221 N. La Salle St., Chicago 1, Ill.

Plastilock 500, a new non-thermoplastic, water and aromatic oil-resistant adhesive for bonding metals, woods, plastics and ceramic materials to themselves or to each other, has been announced by Goodrich.

Pliobond in Land Mines

By means of Pliobond, American soldiers on foreign battlefronts are using a type of land mine which foils detection by the enemy, according to an announcement of the Goodyear Tire & Rubber Co., Akron. Since the mines are entirely non-metallic, they cannot be detected, once in place, by conventional enemy mine-detectors. The mines are constructed with porcelain or glass parts which are sealed with Pliobond to a flexible synthetic rubber bellows in a thoroughly watertight manner. Pressure on the top of the mines compresses the bellows and explodes the mines. The mines have been produced in several plants in the eastern part of the country.

Trenton Group Hears Ruderman

Irving W. Ruderman, of the Panelyte Division of the St. Regis Paper Co., gave a talk on "The Isolation of Some Poly-nuclear Substances from the Phenol-Formaldehyde Reaction" at the second meeting of the newly-formed Trenton Chemical Society, held in Trenton, N. J., on May 1. The talk was illustrated with slides and blackboard notations. Approximately 50 members and guests attended. Articles covering the name, territory, membership, and dues were adopted.

New A.M.A. Publications

Six new booklets have recently been added to the personnel series published by the American Management Association, 330 W. 42nd St., New York 18, N. Y. Titles of the booklets are: *Reemployment of Veterans* (No. 76), *The New Pattern of Labor Relations* (No. 79), *Employer Responsibility for Veteran Reemployment* (No. 83), *Personnel Policies of Reconversion* (No. 84), *Practical Techniques of Collective Bargaining* (No. 86), and *The Foreman in Labor Relations* (No. 87).

Cotton Saturating Paper

A complete line of cotton saturating paper, suitable for use by manufacturers of artificial leather using natural or synthetic rubber latices, is currently being offered by the Walker Goulard Plehn Co., Inc., 450 Pearl St., New York City, successors to the Maurice O'Meara Co. Different colors can be obtained by adding color to the saturant.

The 1945 edition of the *Market Guide for Latin America,* which lists more than 70,000 buyers and agents in all countries of South and Central America, and in Mexico, Cuba, Puerto Rico, the West Indies, and the Guianas, has been issued by the American Foreign Credit Underwriters Corp., 170 Broadway, New York 7, N. Y.

DETROIT RUBBER GROUP HEARS SYMPOSIUM ON LABORATORY EQUIPMENT

An interesting symposium on laboratory equipment used for the evaluation of rubber and plastics featured the Spring meeting of the Detroit Rubber & Plastics Group, Inc., held on May 11 at the Detroit-Leland Hotel in Detroit, Mich. Approximately 150 members and guests were in attendance. Musical entertainment was furnished during dinner.

Prior to the technical session, short committee reports were given. Fred Wehmer (Minnesota Mining), chairman of the Educational Committee, briefly stated the aims and objectives of the Wayne Educational Project, sponsored by the group, and Dr. C. W. Selheimer, of Wayne University, reported on the wartime contribution made by this project in the fields of rubber and plastics. Dr. Selheimer said that during the years 1942-1945, war training courses had been given as follows: (a) lecture, (b) first laboratory course, and (c) second laboratory course, all meeting three hours per week for a period of 12 weeks. Total enrollments in these courses, he said, were respectively 355, 206 and 85.

Dr. J. W. Temple (U. S. Rubber), chairman of the Program Committee, then took over and introduced the speakers in the order in which their respective laboratories were established. S. D. Gehman represented the Goodyear Tire & Rubber Co.; B. G. Labbe, substituting for Dr. J. W. Schade, prevented from attending because of illness, represented the Rubber Reserve laboratory, operated by the University of Akron; and J. W. Liska represented the Firestone Tire & Rubber Co. The central topic of the symposium was "Three Modern Laboratories, and Their Most Interesting Equipment for Evaluating Rubber and Plastics."

Gehman on Goodyear Laboratory

Dr. Gehman, the first speaker, discussed some of the basic physical research work on synthetic rubber being carried on at the Goodyear laboratory, and the equipment used in this work. He first described the large recording infra-red spectrometer which was built at the laboratory for determining the chemical structure of synthetic rubbers by means of infra-red absorption spectra. This device helps to distinguish between and identify such closely related structures as the copolymers of butadiene with the three isomeric monochlorostyrenes, while differences in the structure of mass and emulsion polymers are readily shown. Infra-red spectra also appear to have unique value for studying the chemical reactions occurring in the aging and oxidation of rubber.

Next Dr. Gehman discussed how the effect of low temperatures on stiffness can be determined by a torsional test on a small strip. In the equipment for this test used at the Goodyear laboratory, five such strips are mounted on a circular rack in an insulated cylindrical container. Dry-ice is placed in the bottom of the cylinder and the temperature regulated by controlling the volume of an air stream blown through the dry-ice and around the samples. The samples are attached in succession to a torsion wire and torsion head. The twist of each sample for a 90° twist of the torsion head is observed as a function of temperature.

Stating that simple plasticity measurements are not sufficient to evaluate processability, and that usually a milling or extrusion test is required which involves, in addition to a flow measurement, the qualitative observation of the smoothness, tearing, swelling or shrinking of the sample, the speaker described how Goodyear technicians worked out a suitable technique in which the Olsen Flow Tester has been found useful in judging processability. A record of plastic flow is secured, he said, and in addition the smoothness and shrinkage of the sample is observed. The small sample used makes the test sensitive to the degree of homogeneity of the batch.

In concluding his talk, Dr. Gehman told how high speed stroboscopic pictures were taken at the laboratory to study the nature of the retraction of rubber-like materials when released after stretching. He said that it was found that the retraction occurs as a wave starting at the free end and progressing down the strip. An electronic timing circuit and accessories were devised in order to measure retraction velocities accurately and with facility. Measurement of retraction velocity, he reported, is a rapid and convenient method of determining "best cure."

Labbe on Government Laboratory

Mr. Labbe, the second speaker, described in full the Government laboratory at Akron, of which four buildings are already in use, including a pilot plant, evaluation laboratory, mechanical building, and drier house. A new storage building is yet to be built. The object of the pilot plant is to produce synthetic rubbers from new monomers and to study conditions of operating, such as changes in agitation, temperature, modifier, etc.

Pilot plant facilities at the laboratory, according to the speaker, include offices, a control laboratory, and a five gallon area which contains fourteen 5-gallon glass-lined reactors and two 5-gallon stainless steel reactors with average batch yields of 7 pounds. Another area contains two 80-gallon reactors with 120 pound yield and two 500-gallon reactors with 850 pound yield. Bottle polymerization facilities are available to make 50 gram specimens.

Mr. Labbe then described the mill room in the evaluation laboratory. This room contains three 6 x 12 mills which feature safety devices designed by J. W. Schade. Control switches are forward-reverse-stop, with covered reverse button. A knee stop is regularly used as a means of establishing operating habits. A pivoted guard above the rolls, connected to a mercoid switch, makes for greater safety in adding ingredients to the batch.

(EDITOR'S NOTE: This guard was described in detail in the May, 1945, issue of RUBBER AGE.) There is also a 6 x 12 mill with variable speed drive on each roll, and a 10 x 20 mill with enclosed oil feed system. A 4 x 9 mill is soon to be installed. For internal mixing, there is a Banbury size B, capable of processing 2 pounds of raw material for tread batches. The press room contains 6 double-deck oil hydraulic presses. The Rugosimeter is used as one test to evaluate processing properties of various rubbers.

Mr. Labbe also described the air-conditioned physical testing laboratory, which is equipped with the most modern of testing devices, including all types of tensile testers for room temperature and elevated temperatures. A Goodrich flexometer is equipped with recording potentiometer and guards for weight. Flex life is determined by a DeMattia machine; torsional hysteresis by the Mooney hysterometer. Williams and Goodrich plastometers are used for softness, plasticity and retentivity in one operation, and rebounds are determined by the Goodyear-Healy and Bashore resiliometer.

Liska on Firestone Laboratory

In discussing the modern evaluation methods employed in the Firestone laboratory, Mr. Liska, the final speaker, covered five major topics, including dynamic tests of rubber-like materials, stress relaxation, x-ray diffraction, the electron microscope, and low-temperature bending modulus.

In connection with dynamic tests, Mr. Liska described the Goodyear and Firestone resonance vibrator units, developed to eliminate some of the difficulties of older testing machines. The Goodyear unit subjects the samples to compressive forces, while the Firestone unit operates in shear. These machines are capable of determining dynamic modulus, hysteresis index at constant stress, static modulus, and hysteresis index at constant deflection, and have been used in the solution of special problems involving heat generation at constant deflection or at constant stress.

Stating that creep and permanent set have been studied in the past, but that the empirical results are hard to interpret, Mr. Liska said that measurement of stress relaxation in samples at fixed elongation requires more equipment but results are easier to interpret. He gave the results of this latter test on Hevea, GR-S, GR-I and GR-M, as well as a description of the equipment employed and its operation. Referring to x-ray diffraction, the speaker said that this method is an excellent means of identifying and analyzing both organic and inorganic substances. He also stated that x-ray studies have indicated that crystals formed by stretching are the same as those formed by freezing. The construction and operation of the electron microscope was also described.

THOMAS STRESSES SCIENCE AS WORLD PEACE FACTOR

The important role to be played by science in establishing and maintaining world peace was stressed by John W. Thomas, chairman of the board of the Firestone Tire & Rubber Co., in Columbus, Ohio, on May 11, the occasion being the presentation to Mr. Thomas of the Gold Medal of the American Institute of Chemists. Other speakers at the medal ceremonies included Dr. H. E. Simmons, president of the University of Akron, and Col. Bradley Dewey, president of the Dewey and Almy Chemical Co., and former Rubber Director.

After introductory remarks by Dr. E. L. Luaces, chairman of the Miami Valley Chapter of the A.I.C., Dr. Simmons discussed "Thomas, the Man," giving a personality sketch of the Firestone executive and recalling high points of his 42 years of association with Mr. Thomas, beginning with the days when they were fellow students at the University of Akron. Col. Dewey discussed "Thomas, the Chemist and Administrator," and told of his association with Mr. Thomas in meeting critical war production problems. He also outlined Firestone's accomplishments in the production of synthetic rubber and of other vitally needed war products.

In his talk following presentation of the medal by Dr. Gustav Egloff, president of the A.I.C., Mr. Thomas paid tribute to all the men of science in the rubber industry who have contributed so much to the progress of civilization and towards ultimate victory in the war. He pointed out that American scientists not only accomplished the near miracle of producing synthetic rubber in volume, but that they produced not one but many types of synthetic rubber. He added that it will take a number of years before we will be able to utilize fully these many tailor-made products of the laboratories.

Reviews Pneumatic Tire History

Citing the tire industry as an example of science's role to world economy, Mr. Thomas recalled that when the rubber industry started making pneumatic tires in any quantity it was common talk that the saturation point for motor cars would be one million, and yet, some twenty years later, America alone was turning out 4,000,000 cars in a single year. Recalling the days when a tire that would run 5,000 miles was the goal of the rubber industry, he predicted that the industry expects ultimately to produce a tire that will last 100,000 miles "and it may be made of a substitute for natural rubber."

In concluding his address, Mr. Thomas forecast the day when scientists will give mankind almost complete independence of natural materials, when man may be able to build beautiful, comfortable, low-priced homes without forest, stone quarries, bricks or mortar, by using such materials as plastics, glass and other chemical combinations, the properties of which we are just beginning to learn. He expressed the belief that the next fifty years will bring changes and improvements in our way of life that will completely overshadow the great accomplishments of the past half-century.

Mr. Thomas was born on November 18, 1880, in Tallmadge, Ohio. Working his way through Buchtel College (now the University of Akron), he received a bachelor's degree in chemistry in 1904. While working as a chemist in an Akron rubber compounding laboratory, he attracted the attention of the late Harvey S. Firestone, whose company he joined in 1908. In 1916 he became a director of the company, in 1919 vice-president, and president in 1932.

Coming Events

June 22. Boston Rubber Group, Outing, Woodland Golf Club, Newton, Mass.

June 29. R. I. Rubber Club, Wannamoisett Country Club, East Providence, R. I.

July 21-22. Los Angeles Rubber Group, Annual Outing, Uplifters' Club, Santa Monica, Calif.

Sept. 13. Detroit Rubber & Plastics Group, Detroit, Mich.

Tribute to Schidrowitz

The April 14, 1945, issue of the *India-Rubber Journal,* marked the twenty-fifth year in which the section on "Views and Reviews," conducted by Dr. Philip Schidrowitz, noted British rubber technologist, appeared. In all that time the section has appeared regularly with the exception of one occasion during the winter of 1940-41 when there was considerable air activity over London and the contribution went astray. To commemorate the event, Dr. Schidrowitz was tendered a luncheon at the Waldorf Hotel in London on May 10 by Maclaren and Sons, Ltd., publishers of the *Journal,* at which a number of prominent friends, all identified with the rubber industry, paid tribute to his work.

Form Asbury Corporation

The Asbury Corporation has been formed by members of the Edison Machine Shop of Doylestown, Penna., manufacturers of precision grinders and airplane parts, to market the Asbury Fluid Impactor, a machine for producing dispersions, emulsions and homogenizing solids and pastes, permitting the production of the finished product in one continuous process. Officers of the new corporation include Charles T. Asbury, president; R. Stanley Osborn and Norman J. Villard, vice-presidents; and Albert J. Craig, secretary-treasurer.

FUTURE RUBBER DEMANDS OUTLINED BY CROSSLAND

In an address given before the National Safety and Fire Conference at St. Louis, Mo., on May 16, S. T. Crossland, executive vice-president of the Rubber Reserve Co., declared that the synthetic rubber industry in 1945 must be geared to produce 124% of the capacity for which plants were designed if we are to meet the projected needs of the Armed Services and also produce the amount deemed essential for maintenance of the civilian economy and for export. He said further that in 1946 production must be stepped up to 145% of capacity to meet the same objectives, estimating that 1,000,000 long tons will be needed in 1945 and 1,200,000 in 1946.

Between June, 1942, and May 1, 1945, Mr. Crossland stated, the amount of synthetic rubber produced for the account of Rubber Reserve Co. in Government-owned facilities totalled 1,211,125 tons. Of that amount 3,599 tons were produced in 1942, 207,864 tons in 1943, and 737,092 tons in 1944. In the first four months of this year the production totalled 296,045 long tons, he revealed. At the beginning of 1945, he added, our stock of natural rubber had dropped to 93,650 long tons.

Discussing the current survey being made of German synthetic plants, Mr. Crossland declared that there has been a wide range of conjecture in this country on the subject of German synthetic rubber. Because of the circumstances of war, it was possible to obtain only the most meager information about the enemy's rubber, its quality, or the techniques of its production. Now, however, considerable information regarding the quality of German rubber and the methods used in its manufacture is available to us. Upon the basis of this information, it is believed that German rubber is of a different type than, and in many respects the quality is inferior to, American rubber.

A particular deficiency of German synthetic rubber, Mr. Crossland said, is in its processing characteristics. GR-S can be processed much more easily and, consequently, is considered more suitable for a large-scale manufacturing operation. Notwithstanding the probability of the general superiority of American synthetic rubber, he said, we hope to obtain additional information about the German product which might be of value in solving some of our particular problems.

Factors indicating a continuing increase in rubber consumption for several years during the post-war period, Mr. Crossland said, are: (1) increase in truck and bus transportation as a result of world-wide large-scale building and reconstruction; (2) the deferred passenger car tire demand; (3) the deferred truck, bus and tractor tire demand; (4) increased passenger and commercial vehicle manufacture; (5) increased use of rubber in products other than tires; and (6) the continuation for some years after the war of the military demand for rubber, as a result of various activities.

RUBBER TECHNICAL SESSION HELD AT CANADIAN INSTITUTE CONFERENCE

A technical session dealing with rubber chemistry was one of the features of the First Annual Conference of the newly-formed Chemical Institute of Canada, held at the Chateau Frontenac, Quebec City, Canada, on June 4th, 5th, and 6th. The rubber session, which included three papers, was held on the morning of June 5th, with M. F. Anderson, of the Dominion Rubber Company, Montreal, as chairman. Conference registration numbered almost 600. Attendance at the rubber meeting numbered 60 members and guests.

The application of the Ontario Rubber Section to become part of the Chemical Institute of Canada was accepted by the Board of Directors of the Institute. A proposal to form a national rubber division of the Chemical Institute of Canada was discussed but no decisions were reached on this subject.

Paper on Black Structure

The first paper, entitled "Relationship between Structure of Acetylene Black and Resistivity in Electrically Conducting Polymeric Compounds," by R. H. Hall, B. P. Buckley and T. R. Griffith, of Shawinigan Chemicals, Limited, and the National Research Council, was presented by Mr. Griffith. He stated that electrically conducting black is being used in flooring, belting, aircraft, adhesives for plywood, airplane tires, etc. He outlined the roles of structure, pH and surface area, and showed slides of electron microscope photographs which indicated that acetylene black has a stiff, network type of structure. Lampblack has about the same amount of structure as acetylene black.

The ability of black to conduct current, according to the speaker, appears due to the formation of clusters of particles and is dependent upon the bulk density of the clusters. Stocks made by the addition of black to the liquid during the preparation of a rubber solution or dispersion have a much higher conductivity than similar stocks compounded entirely on a mill. Milling appears to break the structure of acetylene black and hence destroys the conductive properties. The absorptive capacity is a measure of the amount of structure possessed by a black. A black of high absorptive capacity has a large amount of structure and imparts high electrical conductivity to the vulcanizate.

Outlines Production of Butadiene

The second speaker, H. R. Emmerson, of the St. Clair Processing Corporation, Sarnia, outlined the various steps in the manufacture of butadiene in a paper entitled "Production of Butadiene in Canada" by C. F. Burke. He explained that Sarnia was chosen as the location for Canada's synthetic rubber plants because it possessed crude oil (via pipeline), cooling water, brine wells, water and rail transportation facilities, and was near sources of benzol. In manufacturing butadiene high temperatures are required (1300-1400° F.). Inside lined pipe is used in the plant at Sarnia.

As a first step in the process petroleum is cracked and the light gases are passed through towers to eliminate the C_3 cut and through further towers to dispose of the C_2 and C_5. The C_4 cut (consisting of butanes, butylenes and isobutylene) is treated with sulfuric acid to remove the isobutylene. By means of acetone and water, which are fed in at the top of the tower, the boiling points of butanes and butylenes are spread so that the butanes go off at the top and the butylenes at the bottom of the tower. The butylenes are next stripped of acetone.

In making butadiene a catalyst consisting mainly of iron oxide on a magnesium base is used. Steam and butylene are fed into the reactor and 12% butadiene is obtained on the first pass through it. The mixture of butadiene and butylenes is then cooled and compressed and further impurities are removed. It is passed into cuprous ammonium acetate solvent (which takes out the butadiene) and 98.5% minimum butadiene is produced. It is finally stripped and re-run to remove C_3 and remaining impurities. The butadiene is then ready for use in synthetic rubber.

Effect of Moisture Discussed

The concluding paper, entitled "Effect of Moisture on Rate of Cure and Physical Properties of GR-S Synthetic Rubber," by I. C. Rush, of Canadian Synthetic Rubber, Limited, was presented by E. D. Maher. He reported that the work at Sarnia had been performed as a part of a U. S.-Canadian program to determine the effect of moisture on GR-S. Three methods of adding moisture were used which consisted of (1) mixing water into the carbon black; (2) adding water on the mill at the end of the mix; and (3) finally soaking GR-S in water. The following methods were used for evaluating rate of cure: (a) Time required to attain maximum tensile; (b) Time required to attain constant modulus; (c) Tensile Ratio; (d) Modulus Ratio.

Modulus Ratio appeared to be the most accurate of the four methods. An increase in modulus ratio indicated an increase in the rate of cure. When moisture was added directly to the carbon black or when it was added to the mill rolls a gradual increase in Modulus Ratio was noted as the percentage of water was increased. When the raw polymer was soaked in water there was practically no effect on rate of cure. It appeared to be the moisture retained after mixing and not the amount of water added that affected rate of cure (up to 3%).

When 3% or less of water was added either to the carbon black or to the raw polymer there was no appreciable effect on rate of cure and the water was dissipated during mixing. It was concluded, therefore, that if the moisture content of GR-S was less than 3% the rate of cure should not be affected. With reference to the effect of moisture on the physical properties of the vulcanizates, it was found that there were no significant variations in tensile and elongation even when large amounts of moisture were present in the original mix.

DuPont Opens Akron Office

A branch office of the Rubber Chemicals Division of E. I. du Pont de Nemours & Co., Inc., has been opened in temporary quarters in the Ohio Building, 175 So. Main St., Akron, Ohio. The telephone number is Hemlock 3161. The

Irene Scott

office will be occupied pending the remodeling of the two-story building at 311 So. High Street which was recently purchased by the Division for a sales office and technical laboratory. The Akron branch is managed by Harry A. Hoffman, while Ralph A. Appleby acts as technical sales representative in the Akron district. Miss Irene Scott, who was with the Office of the Rubber Director at Washington from 1942 to October, 1944, and previously with the U. S. Rubber Co. at both Detroit and New York, is chief clerk of the Akron office.

June Tire Quotas

The quota of passenger car tires for June is 2,500,000 units. This quota, which includes motorcycle tires, was originally set by OPA on May 27 at 2,000,000 units, but was increased to the 2,500,000 figure on June 5. It compares with 1,500,000 tires allowed for May. The June quotas of truck and bus tires were also increased over May's total. The June quota for tires 8.25 and larger, originally set at 164,750, was finally set at 189,750, which compares with 156,000 for May. Figures for sizes 7.50 or smaller are 360,000 and 314,000, respectively. June tractor-implement tires quotas were unchanged from May, being 70,000 for size 7.50 and smaller and 40,000 for sizes larger than 7.50. OPA announced on June 5 that in the future specific tire sizes will be indicated on all certificates for large and small truck tires.

PRIVATE PLANT OWNERSHIP URGED BY DR. GILLILAND

In an address made following his acceptance of the Leo Hendrick Baekeland Award of the North Jersey Section of the American Chemical Society, consisting of a gold medal and $1,000, Dr. Edwin R. Gilliland called for transference of the synthetic rubber industry from government to private ownership as soon as possible. Dr. Gilliland, who is professor of chemical engineering at the Massachusetts Institute of Technology, was formerly Assistant Rubber Director and is now serving with the Office of Scientific Research and Development. The presentation was made at a dinner held in Newark, N. J., on May 13.

In the years ahead when jobs are a major problem, the synthetic rubber industry can made a real contribution, Dr. Gilliland said. The country's interests would be best served by transferring this industry to private operation as soon as possible, and in doing so a great deal of thought should be given as to the best course for protecting the public and still making it attractive for private initiative to develop and improve synthetic rubber.

Asserting that he had no doubt of the ability of chemists and engineers to develop synthetic rubbers until they would be both better in quality and cheaper than natural rubber, Dr. Gilliland expressed doubt whether the necessary research and development would be carried on under a program of continued Government ownership. At present, he said, the synthetic polymers available can replace natural rubber for about 75% of the tonnage used, and give products of satisfactory or superior quality. Another 15% of the tonnage can be used to give products of inferior but usable quality, he said, while the remaining 10% of the products still require natural rubber.

Predicts Equality of Buna S

Predicting that for several years the world would be able to consume all of the synthetics and natural rubber available to meet deferred needs, Dr. Gilliland said that Buna S would be the chief competitor of natural rubber and that by 1950 it will be of at least equal quality. Cost considerations, he predicted, will therefore largely determine the result of the competition.

The largest factor in the cost of Buna S is the cost of butadiene, he said, which is now made from alcohol from agricultural products at a cost of more than 90c a gallon. It should be possible, however, to make it from petroleum butylenes at a cost of 6½c to 8c a pound, in the opinion of the speaker.

At this cost it should be possible to produce 400,000 to 500,000 long tons of Buna S a year to sell at a cost of 15c a pound and still allow a net profit and an adequate return on investment, Dr. Gilliland declared. He also remarked that recent operating results indicate that Butyl rubber could be produced and sold at a price of 15c to 18c a pound.

Wetherbee Joins General Latex

Burt Wetherbee

Burt Wetherbee, formerly manager of technical service for the American Resinous Chemicals Corp. and previously associated for many years with the Globe Woven Belting Co., Buffalo, N. Y., as manager of research, has been appointed to the technical sales organization of the General Latex & Chemical Corp. In his new position, he will be responsible for the territory including western New York, Ohio, Michigan, Pennsylvania, New Jersey and Maryland. He will continue to make his headquarters in Buffalo, and to reside at 525 Washington Highway, Snyder, N. Y. Long associated with the latex emulsions and dispersions industries, Mr. Wetherbee is widely known, and has published several articles on these subjects in rubber periodicals. He has also been active in professional groups. As one of the organizers of the Buffalo Rubber Group, he early served in all the offices of that group. He is a member of the American Chemical Society, American Society for Testing Materials, American Institute for Chemists, Society of Automotive Engineers, the Chemists' Club, the Akron City Club, and several other organizations.

G-E Plans New Laboratory

The General Electric Co., Schenectady, N. Y., is planning to erect a new building for its research laboratories at Niskayuna, N. Y., about four and one-half miles from Schenectady. The new building will include 200,000 square feet of working space, in addition to an auditorium, dining room, conference rooms, etc. Walls between rooms will be movable, capable of being placed at 18-inch intervals, so that rooms may easily be made large or small as desired. Benches and all furnishings will be standardized so that they can easily be shifted from place to place as the need arises. The building will be air-conditioned throughout. Wires and pipes carrying various kinds and voltages of electricity, compressed air, suction, illuminating gas, hydrogen, oxygen, etc., will interlace the building in such a fashion that they can be brought into any room.

U. S. RUBBER TO INTRODUCE NEW TYPE CUSHION SUPPORT

An important innovation in post-war seating is promised by the United States Rubber Co., which has developed a new type cushion support for latex cushioning material which, through its design, will incorporate the leaf spring principle into seating.

By use of the new seating base, the company will be able, after the war, to supply in volume complete cushioning units for installation in automobiles, busses, theatres, railroads, hotels, steamships, auditoriums and homes. Advantages include simplification of construction, assembly and installation, space-saving and greater comfort in seating.

According to U. S. Rubber, the new equipment, which eliminates the traditional coil springs from the cushion support, will bring increased comfort because it combines leaf steel springs and the flexible surface of a diaphragm. Latex cushions can be easily and quickly cemented to the new cushion carrier, which will be known as Flx-i-base and will be part of the seat frame itself. Thinner, less expensive latex cushions can be used in seating with the same degree of comfort. Upholstery can be either sewed or cemented on, with elimination of tacks.

In auto cushioning, use of this new type cushion carrier would simplify manufacturing, since seat and back cushions could be reduced to sub-assembly units which could be combined in different ways into automobile seats. In transportation units such as cars, busses and railroads, the ride element would be compensated for by Flx-i-base which functions as a leaf spring. In theatres, a seating unit with a thin latex cushion set on this thin cushion support would bring an appreciable saving in aisle space.

New Trade Names Adopted

Effective April 1, the Electrochemicals Departments of E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Delaware, adopted the name of "Elvanol" for products formerly sold as polyvinyl alcohol, PVA, PV alcohol, and other similar names, and that of "Elvacet" for products formerly sold under the names of PV acetate, polyvinyl acetate emulsion, polyvinyl acetate beads, and others denoting various forms and grades of polyvinyl acetate.

Announce New Soling Cement

A new shoe-soling cement made of synthetic rubber, called Cement 249X3, has been developed by the U. S. Rubber Co. The new cement forms an adhesive bond which requires 14 pounds per square inch pull to separate, compared with 11 pounds in pre-war cement. Best results are achieved by lightly roughening the leather surface to be joined and applying a thin coat of cement. The new cement is said to spread farther and dry faster than any cement previously made for soling.

BUSENBURG, MOORE, VANCE HEAD AKRON RUBBER GROUP

Earl B. Busenburg, of the Philadelphia Rubber Works Co., and Jack R. Moore, of the Standard Chemical Co., were elected chairman and vice-chairman, respectively, of the Akron Rubber Group at the spring meeting of the group, held at the Mayflower Hotel, Akron, Ohio, on May 11. Roy M. Vance, of the General Tire & Rubber Co., was elected secretary-treasurer.

Other features of the meeting, which was attended by approximately 450 members and guests, were a cocktail hour, entertainment, and distribution of prizes. The entertainment program included an orchestra, novelty acts, acrobatic dancing, and an exhibition by H. Walter Grote, midwest representative of the Wilmington Chemical Corp., New York City, of his extraordinary feats of legerdemain. As usual, Mr. Grote succeeded in mystifying his audience. Seventy war-bonds were distributed in the drawing of prizes. The entertainment, refreshments and prizes were made possible by generous contributions from the following concerns:

Adamson United Co., Advance Solvents & Chemical Corp., Akron Paint & Varnish Co., Akron Standard Mold Co., L. Albert & Son, Aluminum Flake Co., American Cyanamid & Chemical Corp., American Zinc Sales Co., Anderson-Prichard Oil Corp., Robert Badenhop Corp., J. T. Baker Chemical Co., Barnsdall Oil Co., Binney & Smith Co., Stewart Bolling & Co., Bridgwater Machine Co., Buxbaum Co., Godfrey L. Cabot, Inc., Caldwell Co., Cannon Mills, Carbide & Carbon Chemicals Corp., Carter Bell Mfg. Co., Celanese Chemical Corp., Central Rubber & Steel Corp., Charles Eneu Johnson & Co., Continental Carbon Co., Columbia Chemical Co., Commercial Solvents Corp.

Also Dayton Rubber Mfg. Co., Dill Mfg. Co., Dow Chemical Co., E. F. Drew & Co., Dugan-Campbell & Co., E. I. du Pont de Nemours & Co., Eastern Magnesia Talc Co., Erie Railroad Co.; Farley, Russell & Co., Farrel-Birmingham Co., Firestone Tire & Rubber Co., R. H. Freitag Mfg. Co., Ralph L. Fuller Associates, General Magnesite & Magnesia Co., General Tire & Rubber Co., B. F. Goodrich Co., B. F. Goodrich Chemical Co., Goodyear Tire & Rubber Co., C. P. Hall Co., Herron Bros. & Meyer, J. M. Huber, Inc., Hycar Chemical Co., *India Rubber World*, Iowa Soap Co., Johnson Rubber Co., J. A. Kendall, Loewenthal Co., W. H. Loomis Talc Corp., McNeil Machine & Engineering Co., Marietta-Harmon Chemicals, Inc., C. F. Marshall & Co., Master Tire & Rubber Corp., Miami Boiler & Machine Co., Midwest Rubber Reclaiming Co., Monsanto Chemical Co., Mt. Vernon Woodberry Mills, Inc., H. Muehlstein & Co., F. F. Myers Co., National Lead Co., National Rubber Machinery Co., National-Standard Co., Naugatuck Chemical, Neville Co., New Jersey Zinc Sales Co., Ohio-Apex, Inc., Ohio Rubber Co.

Also Pennsylvania Industrial Chemical Corp., Pharis Tire & Rubber Co., Philadelphia Rubber Works Co., Phillips Petroleum Co., Piqua Stone Products Co., Precision Scientific Co., Pyramid Rubber Co., Rex-Hide, Inc., Richmond Mica Corp., B. W. Rogers Co., RUBBER AGE, St. Joseph Lead Co., Schibley & Ossmann, A. Schulman, Inc., Seiberling Latex Products Co., Seiberling Rubber Co., Shell Oil Co., V. L. Smithers Laboratories, Southern Acid & Sulphur Co., Robert A. Sperry, Stamford Rubber Supply Co., Stanco Distributors, Inc., Standard Chemical Co., Stauffer Chemical Co., H. S. Stoller Chemical Co., Sun Oil Co., Synthetic Products Co., Tanney-Costello Co., Thiokol Corp., Thompson Weinman & Co., Inc., Titanium Pigment Corp., Turner Halsey Co., United Carbon Co., R. T. Vanderbilt Co., J. J. White Products Co., White & Co., C. K. Williams & Co., Wilmington Chemical Corp., Charles T. Wilson Co., Witco Chemical Co., Xylos Rubber Co.

Lend-Lease Fiction

A chapter in the report to Congress on Lend-Lease operations for the period ended March 31, 1945, is devoted to "Lend-Lease Fact and Fiction" and includes the following: *Fiction*—A chronic rumor which has recurred every time the pincers have tightened around the Nazi-Japanese aggressors concerns the transshipment of American lend-lease planes by the Soviet Union to the Japanese in exchange for rubber. These planes are then allegedly used by the Japanese against our forces. *Fact:* Rumors of this type have been repeatedly investigated by the State and War Departments and the Foreign Economic Administration and have proved to be entirely without foundation. There is not a grain of truth in this rumor.

CHICAGO GROUP ELECTS SHERIDAN AS CHAIRMAN

An election of officers featured the final meeting of the current season of the Chicago Rubber Group, which was held at the Morrison Hotel, Chicago, Ill., on May 18. James P. Sheridan, of the N. J. Zinc Sales Co., was elected chairman, and Francis S. Frost, Jr., of the Frost Rubber Works, vice-chairman. William N. Crumpler, of the George S. Mepham Corp., was named secretary-treasurer.

Dr. Norman A. Shepard, director of research of the American Cyanamid Co., New York City, was the speaker of the evening. Taking for his subject "The Parts Played by Management and by the Technologist in Making Research and Development Work Effective," Dr. Shepard undertook to show how management and the technical man both play major parts in technological advance.

Without capital, which management controls and administers, he pointed out, there could be no large research and development laboratories. On the other hand, he said, the actual technical progress is made by scientifically trained minds, by chemists, physicists, and engineers and, without these, management and the industries they represent can hope for no major increase in the quality of manufactured products or in the number of new products brought onto the market.

Dr. Shepard covered some of the more essential duties and characteristics of a good top-management and also those of a good research personnel, and also brought out some of the flaws of management and defects of research and development workers, and showed how, with the proper coordination and understanding, the roles of each might contribute to productive research and profits.

"The American Way," a new sound motion-picture produced by the Midwest Rubber Reclaiming Co., East St. Louis, Ill., depicting the process of reclaim manufacture, was shown at the meeting, and William Welch, president of Midwest, spoke. The meeting was attended by approximately 165 members and guests.

Wins Scotch Tape Suit

In a decision dated May 28, Judge John P. Barnes of the U. S. District Court, northern district of Illinois, eastern division, found for the Minnesota Mining & Manufacturing Co., St. Paul, Minn., in its action against the International Plastic Corporation, Chicago, Ill., in which it charged infringement of its basic patent covering the transparent, pressure-sensitive tape originated by R. G. Drew and developed and marketed by the 3-M Company for many years under the trade name of "Scotch" Cellulose Tape. The plaintiff 3-M Company was held to be entitled to a permanent injunction and an accounting against the defendants.

Northern California Meets

A meeting of the Northern California Rubber Group was held at the Claremont Hotel, Berkeley, Calif., on April 26. The principal speaker was William Rea, technical sales representative of the United Carbon Co., who discussed current carbon black production and outlined some of the steps being taken by both the government and the industry to relieve the current shortage. Prior to the meeting a questionnaire containing some pertinent problems on compounding was sent to the entire membership. Some of these questions were read at the meeting by Lyn Shaffer (American Rubber Manufacturing) while a few of the more practical answers were furnished. An informal round-table discussion on some of these answers was then held. During the meeting it was announced that Herman Jordan (DuPont) would act as chairman for the forthcoming summer outing, assisted by George Petelin and Lud Dimpfl. E. P. Coxhead (Pioneer Rubber Mills) will be in charge of prizes. Two door prizes awarded at the meeting, donated by the Thiokol Corporation and the Pioneer Rubber Mills, went to B. O. Blackburn and Herman Jordan, respectively.

Quiz Features Montreal Meeting

A special meeting, the last of its 1944-45 season, was held by the Montreal Section, Rubber and Plastics Division, Society of Chemical Industry, on May 4, at the Montreal Technical School, Montreal, Canada. The meeting featured a quiz program, with Joe McCreedy as master of ceremonies and Norman Burnett and Art Bell serving as a board of experts for rubber and John Benedito and Ted Booth for plastics. After the quiz program, the principal of the Technical School, Mr. Beaupré, spoke on the history and aims of the school, and a demonstration on the use of polaroid light for observing stress in plastic parts was then given by Mr. Asselin, plastics instructor. Finally, the meeting broke up into an informal trip through the school's various laboratories, where pupils demonstrated the plastics laboratory equipment. The usual dinner at the Ritz-Carlton Hotel preceded the meeting, with about 35 members and guests in attendance.

Holds Golf Tournament

The first annual golf tournament of the Rubber and Plastics Division, Montreal Section, Society of Chemical Industry, was scheduled to be held on June 12 at the Summerlea Golf and Country Club, Lachine, Quebec, Canada. A report of the tournament will be published in the next issue.

To clarify accounting practices connected with contract settlements and assure greater uniformity in their application, Regulation No. 14, dealing with Termination Cost Memorandums, has been issued by the Office of Contract Settlement, Washington, D. C.

Battle-Scarred Tire

Just how hard hit the British were for rubber supplies early in the war is indicated by the accompanying close-up view of an English half-track tire used in the

African campaign. The tire had seen terrific use and was crudely patched with pieces of rubber nailed to the bead. Several sections of the tire were hand stitched with heavy twine. The tire is one of several secured by the Pharis Tire & Rubber Co., Newark, Ohio, for display purposes.

Niagara Introduces "Niathal"

Tetrachloro phthalic anhydride has been recently introduced by the Niagara Alkali Co., New York City, under the trade name of Niathal. The new chemical is suggested for use as an intermediate or compounding material in the manufacture of synthetic rubbers and resins, plasticizers, protective coatings, insulating materials, esters, etc. A white, odorless powder with a purity greater than 99%, Niathal is non-irritating and non-toxic. It is free-flowing and non-hygroscopic, melts at 254-255° C., and has an appreciable vapor pressure only at elevated temperatures. The boiling point is 362° C. It is soluble to the extent of 2-4% at room temperature in several organic solvents, such as acetone, benzene, and chloro-benzene. Solubilities materially increase with elevation of temperature.

Begin Standard Oil Suit

The trial of the civil suit instituted by the Standard Oil Co. of New Jersey, and three of its affiliates, including the Standard Catalytic Co., to recover 2,500 patents seized by the Alien Property Custodian in 1942 and 1944, on the ground they were controlled by I. G. Farbenindustrie, the German chemical trust, was begun on May 21 in the Federal Court in New York City before Judge Charles W. Wyzanski. Standard Oil claims that the seizure was illegal because ownership of the patents was acquired by the payment of stock of Standard Oil valued at $35,000,000; that all vestige of the German company's interest had disappeared by 1939; and that the Alien Property Custodian had conceded in a consent decree in 1942 that the plaintiffs had a valid interest in the patents. The Buna patents are involved in the action.

Technologists Hear Dannerth

Dr. Frederic Dannerth, industrial research chemist of East Orange, N. J., delivered a lecture on "Synthetic Resin Films for Decorative and Protective Purposes" at a meeting of the American Association of Textile Technologists, held in New York City on May 3. Among the films discussed by Dr. Dannerth were cellophane, cellulose nitrate, cellulose acetate, cellulose acetate-butyrate and ethyl cellulose. He also called attention to polyvinyl chloride, polyvinyl acetate, and their co-polymers, polyvinyl alcohol, vinylidene chloride, and polystyrene, and described "Parlon" and "Pliofilm." A round table discussion followed the lecture with questions being answered by Dr. Dannerth, as chairman, and a board of experts which included Dr. Howard Turner (DuPont), J. W. McLaughlin (Bakelite), and Clyde Segner and Wayne Brinckerhoff (Goodrich). Another feature of the meeting was an exhibition of resin film products supplied by Goodrich, DuPont, Bakelite, Dow Chemical, and other companies.

Outlines Airship Prospects

Lighter-than-aircraft designed to compete economically with all other types of air vehicles was forecast as a post-war possibility by Thomas J. Knowles, vice-president of the Goodyear Aircraft Corp., Akron, in an address given at the Lotos Club, New York City, on May 5. Mr. Knowles described a possible 950-foot-long airship of 10,000,000 cubic feet capacity, a third larger than the Hindenburg, which would have a cruising range of 7,000 miles, a top speed of 90 m.p.h. in flight, and a cruising speed of 75 m.p.h. Such airships, he estimated, would cost $8,000,000 to construct and would require 24 months to build. Mr. Knowles also presented figures designed to show that the airship can operate more economically in per ton mile costs than other aircraft over long, non-stop distances. He said that fares of five cents per passenger-mile are probable.

Heat-Resistant Forming Pad

The production of magnesium sheet metal parts for airplanes is expected to be speeded up as the result of the development of a new heat-resistant synthetic rubber forming pad announced by the U. S. Rubber Co. The pad is a solid chunk of synthetic rubber weighing 2,800 pounds and measuring 116 inches long, 50 inches wide and eight inches thick. It is used as the female die in hydraulic presses to form heated magnesium under 5,000 tons of pressure. A pad for the cold forming of aluminum, manufactured by the company since the beginning of the war, is not suitable for shaping magnesium, because magnesium tends to be brittle when cold. The new pad, however, will withstand temperatures up to 450° F., and, in addition, will stand severe flexing and long wear.

NEWS IN BRIEF

Industrial safety charts, designed to promote safe working practices around common types of industrial equipment, are currently being issued by the Division of Labor Standards of the U. S. Department of Labor, Washington, D. C. These charts are expected to be particularly useful in employee training and educational programs, for mounting on bulletin boards, for reproduction in house organs and trade publications, and in safety training manuals.

Rubber valve seals that have become swollen by use in filling milk bottles have been salvaged by being ground down to exact size with a pneumatic grinder at the Cleveland plant of the Telling-Belle-Vernon Co. A jig devised from an old motor coupling holds the seal, chucked in the shop lathe. The air-operated grinder is adjusted in the tool holder.

The Milburn Co., Detroit, has announced a complete line of Ply-Garb clothing affording protection against oils, acids, caustics, water, dust and fumes. Ply-Garb creations are fabricated from cotton or duck, specially processed with plastics.

Goodyear reports the production of a new kind of hose, specially designed for connections on oil and coolant lines of Army plane engines, which will withstand severe temperatures and has greater strength and flexibility than any previously used. The hose has been flight tested and approved by the AAF.

The Calco Chemical Division, American Cyanamid Co., Bound Brook, N. J., has made available information on its extensive utilization of "Karbate" materials, which indicates the versatility of the materials and their suitability for a variety of chemical applications. "Karbate" graphite base products possess a high coefficient of heat transfer, while the carbon base products are engineered for use where low heat transfer values are desired.

"Let Your Business Grow in Pennsylvania," a pamphlet issued by the Pennsylvania Department of Commerce, Harrisburg, Penna., points out the state's advantages to manufacturers and business men. Rubber products are mentioned as being used locally in larger quantities than are produced in the state.

"What Foremen Want to Know," a comprehensive opinion poll of foremen in American industry, is available upon request to the National Foremen's Institute, Inc., 527 Fifth Ave., New York 17, N. Y.

Monsanto has started full-scale production of vital war chemicals at the new $2,500,000 government-owned Duck River Plant which it is operating for the Chemical Warfare Service at Monsanto, Tenn.

The Firestone Steel Products Co. will shortly take over a former plant of the Carnegie-Illinois Steel Corp. in Cambridge, Ohio, where it will employ 700 people in the production of vital war materials.

Goodyear reports that during the first three weeks of the 120-day tire-production drive, which opened on January 15, 85.8% of 11,902 workers in fifteen of its tire-production divisions did not miss a shift.

In "How to Handle Our Returning Veterans," a special issue of *Management Information*, Allan R. Cullimore, president of the Newark College of Engineering, gives advice on the proper handling of discharged veterans on their return to civilian jobs in industry. A complimentary copy is available to any company executive upon request to the publishers, Elliott Service Co., 219 E. 44th St., New York.

A new Contract Settlement Training Guide, designed to prepare war contractors for handling contract settlement, has been published by the Committee on Training of the Office of Contract Settlement. The booklet is intended to provide basic information for termination coordination committees, which have charge of local contractor training programs. Copies are available without cost from the Office of Contract Settlement, Federal Reserve Building, Washington 25, D. C.

Goodyear plans to sell such household appliances as radios, small electrical appliances, wheel goods and lawnmowers in its 450 company-owned stores and through independent dealers after the war, according to a recent company announcement.

A new "Compass 250" transmission belt utilizing steel cables instead of cord or fabric for the carcass has been announced by Goodyear. Developed especially for post-war machinery, the belt's best applications are described as "new drives which can be initially designed to take full advantage of its merits." It is made with synthetic rubber to resist lubricating oils and other deteriorants.

Goodyear has resumed limited production for civilian use of its Lifeguard tubes in the four most popular sizes.

An entirely new plan for the handling of tire certificates, the first of its kind in the rubber industry, has been put into operation by the Pharis Tire & Rubber Co. and the Park National Bank of Newark, Ohio. Instead of Pharis jobbers sending their free tire ration certificates directly to the company, they now send them to the bank, which has opened a branch in the Pharis plant exclusively for the handling of these certificates.

Thomaston Cotton Mills has moved its New York sales office from 320 Broadway to 40 Worth Street.

Goodyear has developed a new rice field tire for use on tractors and self-propelled combines. The new tire, with deep-ridged, open-center, self-cleaning tread, will be made in several sizes, each being interchangeable on either tractor or combine. A disc has also been developed that can be welded to the rim, making it possible to use the tractor wheels in a dual arrangement on the combine for wet fields.

A new line of synthetic rubber gloves, under the name of "Whale-Hide," has been introduced by the Industrial Products Co., Philadelphia, Penna. The new gloves are said to be exceptionally flexible as well as resistant to all chemicals and solvents.

Plans for the manufacture of a launching propellent for American models of the robot bomb by the Monsanto Chemical Co. have been revealed. Development and testing of the propellent were accomplished through cooperation of Monsanto, the National Defense Research Council, and the Air Technical Service Command.

A handy repair manual, replete with information and instruction on how to repair colthing, miscellaneous textiles, and many other items, has been distributed to reclamation centers and repair shops operated by the Quartermaster Corps. Issued under the designation of "TB QM 22", the manual shows how to organize and lay out repair production lines, how to classify items and route the work, and how to inspect, pack and ship the items.

U. S. Rubber has announced the development of an extruded thread of synthetic rubber which retains elasticity through repeated washings and flexings, which is now being made in the cream color required for corset fabrics as well as black for other uses. Development of the new thread has made possible the resumption of manufacture of "Lastex."

Goodyear has announced the production of a new white replacement and service wringer roll, said to be superior to its pre-war predecessors, in all standard sizes. It is being distributed on a nation-wide basis though the R & S Company, Milwaukee, Wis.

New Rubber Sales Agency

E. P. "Ted" Lambert has organized the E. P. Lambert Co., with offices in the First Central Tower, Akron 8, Ohio, to render personalized sales service in the crude rubber, synthetic rubber and liquid

E. P. "Ted" Lambert

latex fields. Mr. Lambert, who has been manager of the Akron office of Charles T. Wilson, Inc., for many years, will also represent the Neville Co., Pittsburgh, Penna., manufacturers of coumarone resins, plasticizers, solvents and other coal-tar materials, on sales to the rubber industry in the midwestern area.

Name Reconversion Chairman

Appointment of reconversion chairmen for approximately 400 industries was announced on May 24 by the Committee on Period One of WPB. "Period one" is the name given to the time between the victory in Europe and the victory over Japan. E. D. Kelly, of the Rubber Bureau, has been appointed reconversion officer in charge of rubber products. The following code descriptions for rubber products and machinery have been adopted to date, with the code numbers shown in parentheses: Tire Retreading, Recapping, and Repairing Machinery and Equipment (No. 232), Mechanical Rubber Goods, excluding Tires and Tubes (No. 642), Tires and Tubes (No. 643), and Rubber-Making Machinery and Equipment (No. 919).

R. I. Meets on June 29

The next meeting of the Rhode Island Rubber Club will be held at the Wannamoisett Country Club, in East Providence, R. I., on Friday, June 29. The usual golf tournament will get under way at 1:00 P.M. and dinner will be served at 7:30 P.M. Prizes for winners in the tournament will be awarded. Dinner reservations should be made by June 22.

Appoints Export Distributors

The appointment of Paul J. Pauls, Inc., Plainfield, N. J., as export distributors for "Wilchem" rubber chemicals has been announced by the Wilmington Chemical Corp., New York City. The export firm, which was recently reorganized, specializes in chemicals for the rubber, plastics and protective coating industries. P. J. Pauls, who has operated in the export field for more than 20 years and is well-known in world markets, continues as president. Dagfinn G. Thuesen, who has been actively engaged in various phases of the American chemical industry during the past 20 years, has been named vice-president and technical director of the export company.

Reduce Hycar Prices Again

Hycar Chemical Co., Akron 8, Ohio, has announced that for the fifth time it has been possible to reduce the price of Hycar approximately 10 to 11%. Latex prices have also been lowered and in tank car quantities this reduction amounts to more than 16%. Hycar OR-15 is now available at 45c per pound in standard 100 lb. containers and 60c in less than standard containers; Hycar OR-25 at 40c and 55c, respectively; and Hycar OS-10 at 40c and 55c, respectively. Hycar OR-15 Latex now ranges from 43c to 62c a pound, while Hycar OR-25 and Hycar OS-10 latices range from 38c to 57c a pound. Special earned discounts are offered to contract customers.

Improved Mold Lubricant

A new, improved type of Dipex has been made available by Stanco, Inc., 216 W. 14th St., New York 11, N. Y. Unlike its predecessor, which was dark in color and confined in use to molding of dark-colored items, the improved Dipex is light in color and leaves no residue on molded products, and can therefore be used in the manufacture of white and light-colored articles. The improved lubricant is said to give clear, sharp designs. It is freely soluble in water and may be applied in solution by spraying, brushing, or dipping. Its present use is in tire molds and in the manufacture of white surgical rubber goods.

Union Studying New Pacts

The first step toward formulating a plan for corporation-wide bargaining was recently taken by the executive board of the United Rubber Workers of America (CIO). A committee has been appointed to examine the possibilities of such pacts, which would call for the use of a master contract for all plants of an individual company, regardless of the location of the plants. Differentials in wage rates paid for the same operations in the plants would be based on their varying costs of production, according to union officials.

Promotions at Cabot

Several promotions, all effective June 1, have been announced by Godfrey L. Cabot, Inc., Boston, Mass. Owen J. Brown, Jr., has been promoted to the position of general sales manager, succeeding C. W. Bloom, who has resigned

Owen J. Brown, Jr.

to take an important position with another company. Mr. Brown takes office along with a newly-appointed technical sales and service staff which so far includes J. D. Zeller, Bert A. Wilkes, and George J. Duffy. J. Boyd Britton, formerly assistant sales manager, is now assistant to Russel G. Allen, who is vice-president in charge of manufacturing and sales. D. D. Cochrane, formerly in charge of research and development, has been appointed to the vice-president's staff in charge of new projects and production engineering and C. A. Stokes, assistant professor of chemical engineering at M.I.T., has been named head of research and development. Fred H. Amon, for many years technical director of the company and recently returned from an assignment with the Office of the Rubber Director at Washington, continues in his present staff position. In announcing the various promotions, Cabot also revealed the establishment of a new and expanded research and development program.

Mr. Brown, the new general sales manager, was graduated from Tufts College with a B.S. in Chemical Engineering in 1935. He joined the Cabot organization shortly thereafter and has been associated with that organization ever since. He spent his first five years with the company in connection with research and development and the next four years in technical sales and customer service, becoming well known to the rubber manufacturing field. Before assuming the post of general sales manager he was manager of the company's Special Products Division.

NAMES IN THE NEWS

JOSEPH H. HAYDEN, secretary of the Hewitt Rubber Corp., Buffalo, N. Y., and associated with that company for 27 years, has been elected a vice-president. WILLIAM H. WATKINS, head of the accounting department, has been made controller and assistant treasurer.

DR. DAVID F. SMITH, director of research of Johnson & Johnson, New Brunswick, N. J., has been elected a director of the company.

T. U. BLAKE, who has been associated with Goodrich since 1933, most recently as plant engineer of the synthetic rubber plant at Port Neches, Texas, has been named chief engineer of the B. F. Goodrich Chemical Co., Cleveland, Ohio.

LLOYD E. KELLY has been appointed manager of eastern sales of the Pigments Department of E. I. du Pont de Nemours & Co., Inc., with offices at 256 Vanderpool St., Newark, N. J.

CHARLES L. SHELDON, purchasing agent of the Hood Rubber Co., Watertown, Mass., has been elected president of the National Association of Purchasing Agents.

M. A. KIMMEL, who has been associated with the American Resinous Chemicals Corp., Peabody, Mass., for several years, has been named head of the adhesives department. He is a graduate of the Massachusetts Institute of Technology.

FRED W. CLIMER, assistant to the president of the Goodyear Tire & Rubber Co., Akron, has been named an alternate member of the National War Labor Board, representing employers.

RUBIN LEWON, formerly superintendent of the Emeryville, Calif., factory of the Plant Rubber & Asbestos Works, San Francisco, Calif., has been appointed manager of research of that company.

G. P. VINCENT, manager of the sales development and technical service department of the Mathieson Alkali Works, has been appointed to the newly-created position of technical director of the company. R. E. GAGE, director of research and development for 14 years, has been appointed technical advisor.

MAJ. DALE KRAMER, who went into service in September, 1942, as a lieutenant, after serving as operating manager of the field personnel department of the B. F. Goodrich Co., Akron, has been placed on inactive service and has rejoined the company.He has served Goodrich since 1933.

RICHARD C. MURRAY, formerly chief chemist of the Rand Rubber Co., Brooklyn, N. Y., is now associated with the Nic-Co Rubber Co., Connellsville, Penna.

C. P. WEAVER, sales manager of the Cooper Tire Division of the Master Tire & Rubber Corp., Findlay, Ohio, and associated with the Cooper organization for 21 years, has been made vice-president in charge of sales.

JOHN W. THOMAS, chairman of the Firestone Tire & Rubber Co., received the honorary degree of doctor of science from the University of Akron on June 5. The degree was awarded "in recognition of distinguished service to humanity."

WILLIAM J. MCMILLEN, associated with the Mackintosh-Hemphill Co., Pittsburgh, since 1916, most recently as assistant manager of roll sales, has been made manager of roll sales.

L. R. KELTNER, who has been associated with the B. F. Goodrich Co., Akron, since 1926, has been named superintendent of the Akron plant of the company's tire division.

G. A. WOOD, manager of the Los Angeles, Calif., district of the Fisk Tire Division of U. S. Rubber Co., has been appointed to the newly-created position of Pacific Coast sales manager of the division, with headquarters in Los Angeles.

DR. EARL W. GLUESENKAMP and DR. JAMES H. LUM, group leader and project director, respectively, of the Central Research Laboratories of the Monsanto Chemical Co., at Dayton, Ohio, have been appointed assistant research directors of the laboratories. Both have been associated with Monsanto since 1936.

JOHN T. CROWLEY, manager of the New York office of the Servus Rubber Co., has been elected a vice-president and director of the company. Identified with the rubber footwear industry for almost 50 years, he was formerly president of the Lambertville Rubber Co.

DR. NORMAN BEKKEDAHL, of the National Bureau of Standards, Washington, D. C., will return to the Instituto Agronomico do Norte, Belem, Brazil, for a two-month period this summer.

DR. NORMAN A. SHEPARD, chemical director of the American Cyanamid Co., New York City, has been elected a councilor of the American Institute of Chemists for a three-year term.

E. J. CASEY, who has been acting as Deputy Director of the Rubber Products Division of the WPB Rubber Bureau at Washington, has been appointed Director of the Division, succeeding R. G. LANDERS, who has resigned in order to return to his business as president of the Landers Corp., Toledo, Ohio.

HARRY B. SOULEN, vice-president and factory manager of the Mansfield Tire & Rubber Co., Mansfield, Ohio, gave a talk on "Synthetic Rubber" at a meeting of the North Central Chapter of the Ohio Society of Professional Engineers, held in Mansfield on May 10.

E. J. THOMAS, president of the Goodyear Tire & Rubber Co., Akron, has been appointed regional vice-president of the National Association of Manufacturers for the midwest area during 1945. He has also been named a director of the Association.

DR. R. V. V. NICHOLLS, of the Department of Chemistry of McGill University, has been elected chairman of the Montreal Section of the Chemical Institute of Canada.

JAMES J. NEWMAN, vice-president of the B. F. Goodrich Co., Akron, addressed disabled war veterans at Halloran General Hospital, Staten Island, N. Y., on May 16, giving one of a series of four talks arranged to provide convalescing veterans with a preview of certain of the important basic industries of the country.

C. M. VAN EPPS, sales manager, Arizona division, Goodyear Aircraft Corp., since June, 1944, has been appointed assistant general sales manager of Goodyear-Australia.

HANS G. SORENSON, senior agronomist, Bureau of Plant Industry, Soils and Agricultural Engineering, Department of Agriculture, recently left for Brazil, where he will work with the cooperative rubber program in that country. He has been closely associated with the rubber plant investigation work of the Department for the past five years.

CLAUDE V. SWANK, director of manufacturing of Johnson & Johnson, New Brunswick, N. J., has been elected a vice-president of that company.

GEORGE W. O'KEEFE, who for the past two years has been sales manager of the Dryer Division of Proctor & Schwartz, Inc., Philadelphia, Penna., has been named vice-president in charge of dryer sales.

SID PIKE, vice-president of T. A. Desmond & Co., Inc., New York City, importers of crude rubber, who for two years and a half has served as consultant to the Foreign Economic Administration, has resigned his government position and will resume full-time duties with the Desmond company.

New Tire Testing Machine

One of the world's largest tire testing machines, shown in the accompanying illustration, has recently been installed by the Goodyear Tire & Rubber Co. at one of its Akron plants. Designed specifically

for deflection and other tests on big pneumatic earth-moving and huge airplane tires upon which pressure up to 600,000 pounds can be exerted, the machine can also be employed for any type of tensile or compression work within its dimensions and load capacity limits. Hydraulically operated, and supplied with three load ranges, the machine has a clear width of six feet between columns and will accommodate tires or other test specimens measuring up to 12 feet in length or height. Power for operation is supplied by a motor for driving the giant screws and locating the height of the crossheads. The unit also has a smaller motor for developing hydraulic pressure for the loading cylinder.

Rubber Chemicals Committee

The Rubber Accelerator and Antioxidant Industry Advisory Committee has recently been formed by WPB, with L. A. Schlueter, of the Chemicals Bureau, as government presiding officer. The initial meeting of the committee was held in Washington, D. C., on May 9, when the group discussed problems of the rubber industry. The committee's recommendations will be coordinated with the programs of the WPB Rubber Bureau and the Rubber Reserve Co.

Amendment to Ration Order

Tire dealers and persons intending to enter the tire business will no longer be issued certificates for small allotments of tractor-implement tires to increase their inventories, according to Amendment No. 98 to Ration Order 1A (Tires), issued by OPA on May 21. The change does not affect the regular transfer of tractor-implement tires from suppliers to dealers in exchange for replenishment portions of tire certificates surrendered by consumers.

Offers Extra Reclaim Prize

A. Schulman, Inc., scrap rubber dealers of Akron, Ohio, has announced the addition of an extra prize of a $1,000 war bond to the first-prize winner of the contest currently being conducted by the Chicago Rubber Group on "The Utilization of Synthetic Rubber Scrap." All original prizes for the best papers on this subject remain unchanged, as follows: First prize, $500.00; second prize, $300.00; third prize, $200.00. The Schulman offer was made in the hope that the additional prize "will create even greater response to the contest." The contest closes August 1 and all inquiries or papers should be sent to the chairman of the Chicago group, Bruce W. Hubbard, 2512 West 24th St., Chicago, Ill.

Buy Old Town Rubber Co.

The Old Town Rubber Corporation, a newly-organized concern, has purchased the plant and equipment of the Old Town Rubber Co., Old Town, Maine, formerly operated by Samuel and Joseph Goodman. The new corporation is headed by Hewitt MacPherson, formerly vice-president of the Cambridge Rubber Co., as president, and other officers include Carroll D. Cate, vice-president, and Michael Pilot, secretary. Theodore Cowen is superintendent. The Old Town plant, currently producing heels, taps and soles, is running about 80% production on war work. Some plant expansion and improvements are planned as soon as material and equipment become available for such purpose.

Canadian S.A.E. Hears Riesing

E. F. Riesing, chief automotive engineer of the Firestone Industrial Products Co., Detroit, Mich., gave a talk on "Synthetic Rubber and Future Possibilities," at the annual dinner of the Windsor District, Canadian Section, Society of Automotive Engineers, held in Windsor, Canada, on April 20. Mr. Riesing had previously given the same talk and demonstration at the Annual War Production Meeting of the S.A.E., held in Detroit, and before a special meeting of the Rubber and Plastics Division of the A.S.M.E. in New York City.

Article on Rubber Footwear

An interesting article on the manufacture of rubber footwear at the Providence, R. I., plant of the Goodyear Footwear Corporation appears under the title of "Helping the Nation on Its Feet" in the May, 1945, issue of *Esso Oilways*, house organ of the Standard Oil Co. The complete manufacturing operations are traced and some typical formulations for footwear parts used by the company are included. The history of Goodyear Footwear is also given. Copies of the issue may be secured from Esso Marketers, 26 Broadway, New York 4, N. Y.

Floating Repair Depots

Floating repair depots—liberty ships, fully-equipped with shops for repair and maintenance of our fighting aircraft—are helping to keep the Marianas-based B-29s in the air, Air Technical Service Com-

mand headquarters at Wright Field recently revealed. Known formally as "Aircraft Repair Units (Floating)," the shipborne outfits were developed by ATSC, largest of AAF commands, from an idea conceived during operations in the Mediterranean. These vessels have complete facilities for the repair of aircraft, including fuel cells and tires. In the accompanying illustration, Cpl. Rothel E. Stoffel, of East St. Louis, Ill., is patching flotation gear for the salvage of aircraft downed at sea and for other purposes.

Setsit-5 Accelerator

Setsit-5, a new accelerator for GR-S Latex Type No. 3, developed for the purpose of obtaining faster curing GR-S latex films, *i.e.*, fast cures such as are obtained with natural latex, has been introduced by the R. T. Vanderbilt Co., 230 Park Ave., New York, N. Y. Setsit-5, which is a brown liquid that mixes readily into latex, is said to give satisfactory cures at 200° F. and also at room temperature. It is recommended where maximum speed of cure at low temperatures is required in GR-S Latex Type No. 3. Setsit-5 acceleration is also satisfactory for use in vulcanizing rubber reclaim dispersions.

Plans New Tire Laboratory

The Armstrong Rubber Co., West Haven, Conn., is planning to establish a completely modern physical and chemical laoratory as soon as essential materials are available. Activities of the laboratory will be concerned chiefly with the development of better tires and other related products, and the scope of work will include investigations into raw materials, chemicals, compounding, construction and design. The site of the laboratory has not yet been determined.

FINANCIAL NEWS

Offer Armstrong Stock

Fifty thousand shares of 4¼% cumulative convertible preferred stock, $50 par value, and 50,000 shares of Class A common stock, without par value, of the Armstrong Rubber Co., West Haven, Conn., were placed on the market last month. The preferred was priced at $51.00 per share and accrued dividends, and the Class A common at $17.00 per share. Each share of preferred stock is convertible into 2.5 shares of Class A common for five years, into 2.22 shares during the following five years, and into 2 shares thereafter. Ten per cent of net earnings for the preceding year after deducting dividends on the preferred stock is to be set aside annually as a purchase fund for such stock. Net proceeds from the sale will be applied to the repayment of a $3,000,000 bank loan, the balance being added to general corporate funds.

Hewitt Stock Offered

Approximately 80,000 shares of common stock of the Hewitt Rubber Corp., Buffalo, N. Y., was offered to the market last month at a price of $23.50 a share. The stock is part of a total of 199,773 shares recently registered with the Securities & Exchange Commission, as reported in our last issue, the remaining 120,000 shares being reserved for exchange of the outstanding 75,000 shares of Robins Conveyors, Inc. According to the prospectus, Hewitt's net sales in 1944 amounted to $15,845,632, compared with $16,591,021 in 1943 and $12,082,934 in 1942. The company's entire capital, after reacquiring 69,474 shares of its own stock owned by Robins Conveyors, will consist of 278,714 shares of common stock outstanding.

American Cyanamid Company

First Quarter: Net income of $1,463,063, after provision of $3,850,000 for renegotiation and Federal and foreign taxes, which is equal to 54c a share on 2,707,026 shares of common stock, and which compares with $1,445,626, or 54c a share on 2,666,026 shares, for the same period of 1944, when $2,938,406 was provided for renegotiation and taxes.

Anaconda Wire & Cable Co.

First Quarter (Preliminary): Net profit of $273,062, which is equal to 65c a share, and which compares with $325,291, or 77c a share, for the same period of the previous year. The net for both periods is after provisions for taxes and contingencies but subject to renegotiation.

Thermoid Company

First Quarter: Net profit of $287,742, after provision of $192,200 for taxes and $100,000 for contingencies, equal to 44c a common share, which compares with $136,419, after deduction of $96,150 for taxes, or 19c a share, for the first quarter of 1944. Operations of all subsidiaries, including the Joseph Stokes Rubber Co., and the Thermoid Co. of California, Inc., are covered by these figures. Earnings of the Joseph Stokes Rubber Co. and the Joseph Stokes Rubber Co., Ltd., which were excluded from the 1944 report, were subsequently estimated at $75,000.

Lee Rubber & Tire Corp.

Six Months Ended April 30: Net profit of $776,028, after provision of $2,071,403 for Federal taxes, which is equal to $3.21 a share on 241,509 capital shares outstanding, and which compares with $644,863, or $2.67 a share, for the corresponding period of the previous fiscal year, when $1,753,753 was provided for taxes. Net sales of $15,250,584 compare with $13,295,035 for the six months ended April 30, 1944.

Monsanto Chemical Company

First Quarter; Net profit of $1,454,463, which is equal to 97c a share on 1,267,868 shares of common stock, and which compares with $1,132,858, or 72c a share on 1,241,694 common shares, for the first quarter of 1944. Sales for the 1945 period set a new high record of $25,873,654, an increase of 27% over the $20,063,490 for the first quarter of last year.

Norwalk Tire & Rubber Co.

Six Months Ended March 31: Net profit of $116,987, after Federal taxes of $431,775, which is equal to 50c a common share, and which compares with $84,826, after taxes of $180,365, or 34c a share, for the six months ended March 31, 1944. Net sales of $4,399,269 compare with $3,096,758 for the corresponding period of the previous fiscal year.

A. G. Spalding & Bros.

Six Months Ended April 30: Net profit of $335,000, after provision of $375,000 for taxes, which compares with $353,000 for the corresponding period of the previous fiscal year.

O'Sullivan Rubber Company

For 1944: Net income of $354,097, which compares with $276,669 for the previous year. Net sales of $6,927,710 compare with $5,285,340 for 1943.

Columbian Carbon Company

First Quarter: Net earnings of $953,730, after all charges, including provision of $600,000 for Federal taxes, but subject to renegotiation, which is equal to $1.77 a share, and which compares with $859,654, or $1.60 a share, for the first quarter of 1944.

Raybestos-Manhattan, Inc.

First Quarter: Net income of $332,133, after provision of $1,375,000 for taxes and $175,000 for post-war adjustments and other contingencies, which is equal to 53c a share, and which compares with $491,329, or 78c a share, for the first quarter of 1944.

United Carbon Company

First Quarter: Net income of $496,958, after provision of $418,000 for taxes, which is equal to $1.25 a share, and which compares with $534,730 after deduction of $394,500 for taxes, or $1.34 a share, for the first quarter of 1944.

Belden Manufacturing Co.

First Quarter: Net income of $118,373, which is equal to 49c a share, and which compares with $91,206, or 38c a share, for the corresponding period of 1944.

Servus Rubber Company

Year ended Feb. 28: Net income of $159,506, which is equal to $1.66 a common share, against $127,730, or $1.33 a share, for the preceding fiscal year.

Hewitt Rubber Corporation

First Quarter: Net income of $350,000, after tax provision of $129,420, which is equal to 77c a share on 168,188 shares. Net sales were $3,573,122.

Synthetic Resin Plasticizer

Ortho-Nitrodiphenyl, which is said to have amazing versatility when used as a plasticizer, is currently being offered by the Organic Chemicals Division, Monsanto Chemical Co., St. Louis 4, Missouri. The new material can be used alone or in conjunction with other plasticizers, and is applicable to the entire range of synthetic resins from the cellulose esters and ethers through the vinyls and vinyl copolymers. It is compatible with alkyds and also with some of the synthetic rubbers.

Fremont Rubber Reopens

The Fremont Rubber Co., Fremont, Ohio, which was razed by fire on January 12, as previously reported, was scheduled to resume operations about June 1. A modern, fire-proof building has been erected on the site of the plant which burned, and new machinery has been installed. Production capacity will be double what it was before the fire. The plant will employ 65 men working three shifts.

Chemical Labeling Manual

A manual entitled "Guide for the Preparation of Warning Labels for Hazardous Chemicals" has recently been issued by the Manufacturing Chemists' Association of the United States, Washington, D. C. The manual outlines the principles that should govern preparation of precautionary labels. It also includes detailed definitions of terminology and a classification of hazards, offers recommendations for label cautions to be used with each hazard, suggests labels for experimental samples, and gives illustrative specimen labels. The Association has also published a companion manual which contains label cautions for approximately 70 representative types of chemical products.

Rotor Blade Protectors

Development of a rubber material to protect high-speed helicopter rotor blades from the abrasive effects of sand and rain has been disclosed by the U. S. Rubber Co. The material is a strip of specially-compounded synthetic rubber, 18 feet long, which is cemented to the leading edge of each blade. Coast Guard pilots who tested the material flew their machines several hours in heavy rain without damage to the blades. In previous flights, without the protective strips, the fabric covering on the blades started to come off after 10 minutes. The rotor blade tips attain a speed of more than 325 m.p.h., bringing strong air pressure against the fabric surfaces.

Approve Products Exposition

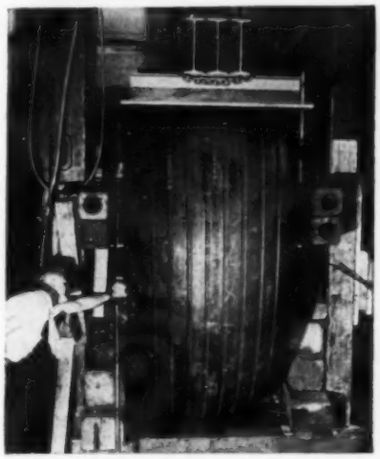
America's first annual "Products of Tomorrow Exposition," plans for which were recently announced, has been approved, and the Office of Defense Transportation is expected shortly to assign a date for the opening, which will be some time between January 1 and March 1, 1946. The exposition will be held in the Coliseum at Chicago, Ill. It will comprise two main divisions, consumer and industrial products, with the addition of others as the demand requires. It is planned to make the exposition an annual event, to provide a springboard for the introduction of new products and new designs by all industry.

"Arrived O. K." is the name of a booklet which describes 3-M adhesives and coatings and gives instructions on the sealing of fibreboard and W-board shipping containers and waterproof case liners for export shipping. Free copies can be obtained from the Minnesota Mining & Manufacturing Co., 900 Fauquier Ave., St. Paul 6, Minn.

Monsanto announces that in the future it will sell dichloro-diphenyl-trichloroethane, the insecticide popularly known as DDT, under the trade name of Santobane.

Build New Airplane Tire

The Goodyear Tire & Rubber Co., Akron, has built a new, experimental airplane tire, which is said to be the largest and heaviest ever built in this



country. The tire measures 110 inches in overall diameter, is 44 inches across the beads and 36 inches from one sidewall to another. The tube alone weighs 250 pounds and the completed tire with its rim and tube weighs 2,600 pounds. The accompanying illustration shows the tire undergoing deflection tests at the laboratory of the Case School of Applied Science, Cleveland, Ohio.

Horn Resumes Brokerage

Frederick J. Horn, until recently secretary and manager of the Rubber Department of Pagel, Horton & Co., Inc., New York City, has resumed business at 347 Madison Ave., New York 17, N. Y., as a broker and manufacturers' agent for crude and synthetic rubber. Mr. Horn, who started in the crude rubber business in 1915 with W. R. Grace & Co., and who has been in that business continuously with the exception of about 14 months' service in the Army during the last war, was engaged in his own business prior to joining Pagel-Horton in 1940. Pagel-Horton has discontinued its rubber department for the time being.

GI Tire Repair in India

Tire retreading is being carried on at an SOS base in Assam, India, where a GI tire repair company, under Capt. Sidney S. Groom, has been organized on a production line basis. When a tire is no longer serviceable, it is loaded on a truck or railway car and sent to the repair outfit. Rubber trees in southern India supply the raw product for repairs and local rubber firms manufacture the various materials needed. Less than 15% of the tires received are discarded as useless. Two shops work on three eight-hour shifts daily, each man having his daily quota of tires to turn out. Many of the men in the unit are ex-tire men, and the company can retread an average of from 4,000 to 5,000 tires a month.

Form Aviation Division

Organization of a new Aviation Products Division, consolidating all related activities of the company, has been announced by the Goodyear Tire & Rubber Co., Akron. Tire, wheel and brake sales for airplanes, formerly a part of the Aviation Sales Division of Government Sales and the former Aviation Products Department, will become part of the new division. Aviation mounts, Airfoam, molded parts and miscellaneous rubber items for aviation will be included in the new organization. R. W. Richardson has been appointed manager of the division.

Westinghouse has brought out the first issue of *Westinghouse Newsfront,* a new monthly house organ. Requests for placement on the mailing list should be addressed to the Editor, *Westinghouse Newsfront,* 306 Fourth Ave., Box 1017, Pittsburgh, Penna.

Firestone has revealed that stock synthetic tires were run at an average speed of more than 100 miles an hour for 500 miles without a blowout in a speed test which was recently held at the Indianapolis Speedway under supervision of the A.A.A.

Goodyear, which started production of bullet-seal fuel cells for warplanes, seacraft, combat vehicles, and similar equipment in March, 1941, recently produced its millionth cell, at Plant III in Akron.

The Yarnall-Waring Co., Chestnut Hill, Philadelphia 18, Penna., producers of steam plant equipment, has released a 16 mm. Kodachrome sound motion picture showing the manufacture of its products and their operation in various industries.

Pioneer Rubber Co., Willard, Ohio, manufacturers of latex and rubber gloves, has purchased three new buildings which will be used for factory purposes.

LOS ANGELES NEWS

The final supper meeting of the current season of the Los Angeles Rubber Group, Inc., was held at the Mayfair Hotel in Los Angeles on May 22. Originally scheduled for June 5, the meeting was pushed ahead so the members could hear a talk by Father Bernard R. Hubbard, S. J., missionary and geologist who has achieved notable fame as "the Glacier Priest" because of his many years of exploration in Alaska. The meeting attracted a record attendance.

Talking of "Post-War Alaska," Father Hubbard discouraged the thought of migration to the Aleutian Islands, which he said had one of the most disagreeable climates in the world. However, he stressed the desirable features of the climate in other parts of the Alaska mainland, and compared the coast climate to that of the Pacific Northwest. He ridiculed the idea that Alaska is a land of Eskimos, pointing out that it is impossible to find Eskimos except in remote areas. Most of the people are like those in the United States, he said, and are interested in exactly the same things. The wealth of the country has scarcely been touched, he added, and the resources are practically unlimited.

Father Hubbard also showed colored motion pictures of different areas in Alaska which he has been visiting from time to time over the past eighteen years. The farms in the valley occupied by the U. S. Government-financed migration program came in for considerable attention and indicated that the experiment was definitely a success. The vegetables produced on these farms, according to the speaker, surpassed anything grown in most areas of the United States itself.

The summer outing of the Los Angeles Rubber Group, which will be held at the Uplifters' Club in Santa Monica on July 21 and 22, will take on the nature of a Spanish fiesta this year. Everyone attending is expected to dress in keeping with the theme, and some bizarre costumes are anticipated. Prizes will be awarded as usual for special events. Entertainment will be provided by Senor Raoul Ramirez, Mexican dance instructor, who furnishes most of the dance talent of this character for the moving picture industry. A unique feature of the outing will be the use of real Mexican money and those attending will be expected to have their cash changed into such exchange. Weighing the crowd will be another feature. Last year, it was reported, 16,432 pounds of rubber men attended the outing.

The usual pre-dinner technical meeting was cancelled at the last meeting of the Los Angeles Rubber Group. These meetings have been addressed for the most part by technologists and have attracted about fifty people as a rule. They will be resumed in the Fall.

Claude H. Kelly, for many years an active member of the Los Angeles Rubber Group, died on May 1 at the age of 61. At the time of his death, Mr. Kelly was assistant works accountant for the Synthetic Rubber Division of the Goodyear Tire & Rubber Co. at Torrance, Calif. He had been associated with Goodyear since 1918.

At this writing Ed Royal and his wife, who went East on an extended trip which was destined to take them to New York, Trenton, Washington and Boston, have not returned. They are due back home sometime this month.

Effective July 1, the B. E. Dougherty Co. will act as Pacific Coast representative for the General Atlas Carbon Co., producers of Gastex and Pelletex. General Atlas was recently acquired by Godfrey L. Cabot, Inc.

George Cunningham, associated with the National Oil Products Co., has been proposed for the vice-chairmanship of the Southern California Section of the American Chemical Society. Elections will be held sometime this month. Mr. Cunningham operates a live stock farm near Taneytown, Maryland.

The issuance of an official journal by the Southern California Section of the American Chemical Society, reference to which was made in these columns recently, is now assured. Prof. A. W. Robertson, of U.C.L.A., will act as editor-in-chief.

R. E. Hutchinson, who has been chairman of the Los Angeles Rubber Group since the beginning of the year, reports that the year's activities to date have been very satisfactory, the attendance at the monthly meetings being all that might be desired. The 1945 Year Book, the largest published thus far, has received wide acceptance. Speakers for the year have been well received by the Group and were almost without exception nationally-known individuals.

A new type of truck tire built of rayon cord, which is made with fewer but stronger plies and is said to be stronger and less subject to serious blowouts than other types, is now in mass production at the Chicopee Falls, Mass., plant of the Fisk Tire Division of U. S. Rubber.

Prepared in cooperation with the Soil Conservation Service of the U. S. Department of Agriculture, "Our Native Land—A Trust to Keep," a booklet designed to explain the necessity of preserving the nation's soil, is currently being distributed by Firestone.

One of the world's biggest and most modern farm tire factories is now in operation in a new addition to the Goodyear plant at Gadsden, Ala. It is part of the $30,000,000 expansion program undertaken less than a year ago by Goodyear throughout the country.

Father Bernard R. Hubbard, the noted "Glacier Priest," chief speaker at the May 22nd meeting of the Los Angeles Rubber Group, with R. E. Hutchinson (Firestone), group chairman.

Synthetic Rubber Softeners

Several new types of synthetic rubber softeners are currently being marketed by Esso Marketers, 26 Broadway, New York 4, N. Y. These include Mentor 25, Nuso 55, Coray 230, and Coblax 1000. Aromatic in nature, Mentor 25 has an initial boiling point of approximately 425° F. It is essentially fugitive at cure temperatures and is said to possess unusual power to reduce nerve. Nuso 55 is a naphthenic oil and has a volatility considerably less than other oils of this type. Brown in color, it has a specific gravity of 0.9509 (60/60° F.) and an aniline point of 130, and is suggested as a general processing oil for reclaimed rubber and for neoprene. Coray 230 is yellow in color and has a specific gravity of 0.9600. It has a minimum of reactivity with sulfur and even when large percentages are present only a slight change in sulfur content is needed to compensate for its presence. Excellent flex-cracking resistance is claimed. Coblax 1000 is a high viscosity naphthenic black oil, useful in tape coating and similar applications where dilution must be obtained at minimum cost and color is no factor. It improves flex-cracking and tear resistance in synthetic stocks.

Additional "E" Awards

Included among companies receiving the Army-Navy "E" award in recent weeks for production efficiency were the following:

Dayton Rubber Manufacturing Co. Dayton, Ohio, and Waynesville, N. C.

Firestone Tire & Rubber Co., Bennettsville, S. C.

Plastic Wire & Cable Corp., Norwich, Conn.

Plymouth Rubber Co., Canton, Mass.

A renewal star has also been awarded to the Oak Rubber Co., Ravenna, Ohio.

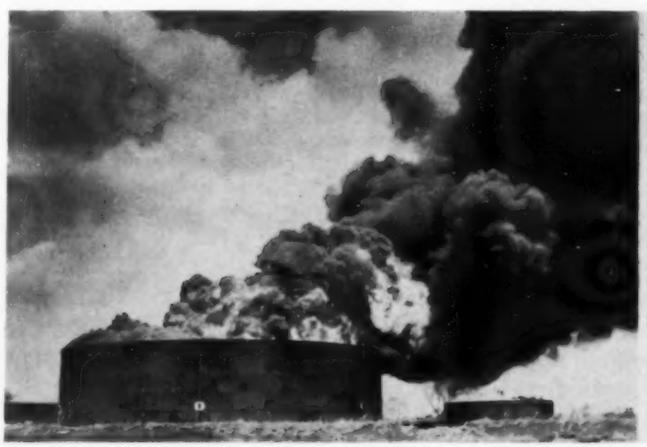
Introduce "Styramic HT"

Production of "Styramic HT," a new thermoplastic said to possess remarkable electrical insulating properties, has been announced by Monsanto Chemical Co., St. Louis, Mo. Styramic HT has a heat distortion point of 236°, yet, it is claimed, can be molded by the fastest and most economical means. Its most significant characteristic is the combination of this heat resistance with high insulating efficiency in uses such as radar, television and facsimile transmission.

Hewitt to Assist Mexican Firm

The Hewitt Rubber Corp., Buffalo, N. Y., has announced a working agreement with Fabrica de Artefactos de Hule Eureka, S. A., of Mexico City, largest manufacturer of mechanical rubber products in Mexico. Under the terms of the agreement, Hewitt will supply mechanical equipment and technical "know-how" to increase the output of the Mexican firm, and in return Hewitt will acquire a preferred stock interest in Eureka, plus annual service fees. The agreement provides that key men and departmental heads of Hewitt will, from time to time, visit Mexico to train Eureka technicians in modern methods of manufacture, and Eureka will send men to Buffalo for first-hand study and analysis of U. S. manufacturing operations. The Mexican company, which is 25 years old, has a plant which occupies 74,000 square feet and employs 600. It has recently bought additional property which will provide 47,000 square feet of floor area for new buildings. According to Manuel Escandon, general manager of Eureka, the company is prepared to spend $500,000 to modernize its plant. Eureka plans to raise its production to 2,000 tons in 1946 and 4,000 tons by 1948.

EFFECTIVENESS OF NEW FIRE FIGHTING EQUIPMENT PROVED IN UNIQUE DEMONSTRATION



The effectiveness of newly-developed fire fighting equipment was demonstrated recently before naval, military and government officials, including representatives of the Rubber Reserve Co., when a 93-foot tank of flaming crude oil which had reached a temperature of over 2,000° F. was extinguished in exactly 4 minutes, 2½ seconds. The event took place at the Moorhead tank farm of the Standard Oil Company of Ohio, near Findlay, Ohio. This was the largest test fire ever extinguished. The record-breaking result was accomplished by air foam developed by the Pyrene Development Corporation of Newark, New Jersey.

Crude oil was pumped into the tank, a torch was applied and, in about 30 seconds, heat recording instruments showed that the temperature had risen to over 2,000° F. The blaze was permitted to build up for nearly 4 minutes. Then air foam was pumped into the tank at a rate of about 15,000 gallons per minute from the applicators of a new auto-induction system developed by Pyrene; the fire was promptly controlled, and, at the end of 4 minutes, 2½ seconds, was officially declared out.

The foam compound was contained in 55-gallon steel drums, from which suction lines fed into water pipes. These pipes carried the foam compound to foam makers on the outside of the oil tank, where air was introduced into the mixture of water and compound. Used in proportions of one part of foam compound to approximately 20 parts of water, the mixture expanded to about 320 gallons of foam per gallon of compound. Pouring from the applicators installed at the top of the tank, the foam flowed down the inside of the tank shell to spread in a thick blanket over the surface of the oil and smothered the flames.

The equipment and compound which made possible the control of fires such as those set at the Moorhead tank farm can be used to protect flammable liquid hazards in a variety of industries, according to C. G. Durfee, president of the Pyrene Development Corporation, who was present at the demonstration.

CANADIAN NEWS

Alan H. Williamson, of Vancouver, has resigned his positions as rubber and timber controller and as vice-chairman of the Wartime Industries Control Board, the Department of Munitions announced on May 31. J. A. Martin, of Waterloo, deputy rubber controller, has been appointed rubber controller, while S. G. Nicholls, of Toronto, has been named deputy rubber controller. Mr. Williamson acted as rubber controller for almost a full four year period.

Aimed at meeting the tremendous postwar backlog of civilian tire demands, a $1,000,000 extension to the Hamilton, Ontario, plant of the Firestone Tire & Rubber Co. of Canada, Ltd., will be built. The announcement was made by Harvey S. Firestone, president of the company, at a meeting of the Hamilton Chamber of Commerce recently. Discussing the proposed expansion, Mr. Firestone said that it is primarily up to private enterprise, not government, to see that men have jobs, but he added that "it is important for national government to set policies which will enable private enterprise to supply enough jobs to maintain and even increase the living standards of its people."

The removal of rationing on inner tubes and a revision of the tire rationing regulations, both effective June 1, was announced by the Department of Munitions and Supply on May 17. Removal of rationing on inner tubes was said to be possible because manufacturing facilities were proportionately greater than tire manufacturing capacity and less natural rubber was required for their production. Easing of the tire rationing regulations brings an estimated additional 35,000 vehicle owners into the category eligible for new tires.

Under the revised order, there are now two classes of priority tire purchasers—those in Class A may upon proof of necessity and the obtaining of a permit buy new tires, while those in Class B are eligible to buy retreaded or used tires. Drivers in Class A include those operating vehicles used 75% or more in mileage to transport five or more employees to or from work in war plants or essential industry. Included in Class B are foreign cars which have been in Canada for more than a week and for which a tire is essential for continued operation.

It has been learned that plans for the construction of a carbon black producing unit in Canada are under serious consideration. If analyses now being made prove to be economically sound, a plant may be erected in the Calgary area, based on abundant Turner Valley natural gas. At present Canada is completely dependent on the United States for all carbon black supplies, other than acetylene black, importing a total of 28,000,000 pounds in 1943. Current demand is considerably above that figure.

Directors of the Dunlop Tire & Rubber Goods Co., Ltd., Toronto, Ontario, have announced that a dividend of 2½% has been declared on the 5% cumulative redeemable first preference shares for the half year ending June 30, payable to shareholders of record at the close of business on June 15.

Following its usual practice, the plant of the Barringham Rubber Co., at Oakville, Ontario, will be closed from June 25 to July 3, inclusive, to enable employees to take their annual vacations. No skeleton staff will be maintained during this period, nor will goods be shipped or received.

Granby Elastic Web of Canada, Ltd., Montreal, reports net profit of $43,915 in 1944, as compared with $38,974 for the previous year. Because certain contracts for war material produced in the 1942-44 period are still subject to renegotiation with the Department of Munitions and Supply, final figures will not be available for some time.

According to reports from Montreal, the British Rubber Co. of Canada, Ltd., will soon construct a canvas shoe plant at Lachine, Quebec, at an estimated cost of $65,000.

Administrators' Orders Nos. A-4, A-5 and A-430, restricting the use of elastic in garments, were revoked by the Wartime Prices and Trade Board on May 14. Allocation control, however, is retained by the Board.

E. G. Crutchley, vice-president in charge of sales for the Rubberset Company, Limited, died on May 3 at his home in Vancouver, B.C. Mr. Crutchley was sales manager for Rubberset Company for ten years and was well known in the drug and hardware trade from coast to coast. He was born in Harrisburg, Pa., and attended Pennsylvania State University.

A complete series of Lonn blow guns, whose fingertip-control is made possible by the use of rubber, is being added to the line of industrial hose sold by Goodrich.

Style "M" fire hose, which is said to be a tremendous new aid in combatting refinery and oil well fires, has been announced by Goodyear.

Farrel Appoints Akron Managers

Armin G. Kessler

Farrel-Birmingham Co., Inc., Ansonia, Conn., has announced the appointment of Armin G. Kessler, vice-president and director of the company, as sales manager of its midwestern district, with headquarters in Akron, and of Harry D. Temporal as manager of its Akron branch. Mr. Kessler is a native of New York State and a graduate of Cornell University. Prior to joining Farrel-Birmingham, he had been associated with the Lakeside Forge and General Ordnance companies. His first position with Farrel-Birmingham, in 1920, was as general manager of the Buffalo, N. Y., plant. In 1923 he was elected a vice-president and director, and in January, 1943, he became general works manager of the firm's three plants. Mr. Temporal has been engaged in machinery sales work for the company for 37 years, and has been in charge of branch offices in Cleveland and Chicago.

Clark Changes Sales Policy

A major change in the sales and distribution of its products has been announced by the Clark Manufacturing Co., 1830 E. 38th St., Cleveland 14, Ohio, manufacturers of steam specialties and fluid controls. During the past 37 years, steam and vacuum traps, pressure regulators, separators, and other steam specialties have been manufactured by Clark and marketed under the name of "Strong Steam Specialties." The recent change in policy brings all of the activities of product-designing, engineering, manufacturing, sales and distribution under the one roof of the company, which will market its products as "Clark Fluid Controls." According to W. S. Goff, president of the company, the firm will henceforth deal directly with its distributors and customers, with present dealers serving as the nucleus of a much larger distribution system.

into this "bank"

GOES MORE THAN RUBBER

When a Monsanto Rubber Service Laboratory technician mills a sample he puts more than rubber into the "bank." Yes, even more than rubber plus the chemicals that have extended the life and service of modern products of synthetic and natural rubber. He also includes the valuable ingredient — *experience.*

Experience in the Monsanto Laboratory has a foundation of a quarter century of service to the Rubber Industry. It is a combination of scientific knowledge and the know how that comes from actual work in the plants of rubber manufacturers. It is the blending of these *two* kinds of experience that makes Monsanto Laboratory recommendations so dependable and practical.

You are invited to bring any wartime compounding problems to Monsanto Laboratories. Its services cost you nothing and place you under no obligation. For further information, please contact MONSANTO CHEMICAL COMPANY, Rubber Service Department, Second National Building, Akron 8, Ohio.

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MONSANTO CHEMICALS
Serving the Rubber Industry

Accelerators
Antioxidants
Colors
Plasticizers
Insoluble Sulfur "60"
Wetting Agents

OBITUARIES

Stacy G. Carkhuff

Stacy G. Carkhuff, secretary of the Firestone Tire & Rubber Co. for 38 years, until his retirement in 1943, died in an Akron hospital on May 30 after an illness of three months. He was 73 years of age.

Born in Jerseyville, Ill., Mr. Carkhuff attended a business college in Chicago and later became a bookkeeper for Rand McNally and the Washburn Crosby Co. While working for the latter, he heard that the late Harvey S. Firestone was planning to form a new rubber company, and in 1901 he got a job with the Firestone firm as a bookkeeper. In 1905 he became secretary of the company. In 1916 he was elected a director. In 1919 he went to Singapore to establish a buying organization for crude rubber, and in 1927 and 1929 he was in England buying land for the future Firestone plant at Brentford.

Mr. Carkhuff was a 32nd degree Mason and a Shriner, past president of the Portage Country Club, and a member of the Akron City Club and the Rotary Club. Active in Akron Y. M. C. A. affairs, he served as chairman of the building committee in 1931 and as president from 1931 to 1935. In 1938 he was elected to the Y. M. C. A. national council and made an honorary life member of the Akron board.

Services were held on June 2 at the Carkhuff home, 1225 W. Market St., Akron. Burial was in Rose Hill Cemetery. Mr. Carkhuff is survived by a widow and two sons.

Weldon Roberts

Weldon Roberts, president and chairman of the board of the Weldon Roberts Rubber Co., Newark, N. J., which he founded in 1912, died recently in New York City at the age of 77. Born in Newark in 1868, he joined the C. Roberts Rubber Co., founded by an uncle, in 1888, and served as president of that company from 1895 to 1910. A pioneer in the field of rubber erasers, he is credited with the introduction of colored erasers in America. He also developed soft rubber bonded abrasives for metal finishing, sold by his company under the name of "Brightboy." A widow and two sons survive.

Roy F. Ketchum

Roy F. Ketchum, head of the Kansas City Rubber and Belting Co., and one of the more popular of the country's rubber goods distributors, died of a heart attack at his home in Kansas City, Mo., on May 9. In his youth, Mr. Ketchum joined the Syracuse Rubber Co., and after serving in the Spanish-American War, he traveled for the New York Belting & Packing Co. About 1912 he settled in Kansas City, where, with an associate, he founded the Kansas City Rubber firm. He is survived by a widow and a son.

Richard M. Hollingshead

Richard M. Hollingshead, founder and president of the R. M. Hollingshead Corp., Camden, N. J., died in a Philadelphia hospital on May 15, after a brief illness. He was 77 years of age. Born in Millville, N. J., Mr. Hollingshead moved to Camden when he was 20 and founded the organization which bears his name. Starting with a small capital and a formula for making saddle soap, he soon added a complete line of chemical products for the harness trade. With the advent of the automobile, he began the manufacture of automotive accessories, which became the most important branch of his business. Later, the company entered the field of tire repair materials. Mr. Hollingshead was a thirty-second degree Mason.

Harry W. Roberts

Harry W. Roberts, president and cofounder of the Pierce-Roberts Rubber Co., Trenton, N. J., died suddenly on May 17 in Trenton. He was 63 years of age. Born in Akron, Ohio, Mr. Roberts attended the public schools of that city and entered the rubber industry as a compounder with the original Faultless Rubber Co. At 21, he organized the Up River Truss Co. in Yonkers, N. Y., which he later moved to Coudersport, Penna. In 1922 he founded the Pierce-Roberts Rubber Co. in association with Clifford R. Pierce, serving as president of the firm until his death. Mr. Roberts was active in the Trenton Chamber of Commerce, Kiwanis Club, Masons and Shrine, and was a member of the Trenton Country Club.

Joseph L. Wayman

Joseph L. Wayman, purchasing agent for the synthetic rubber plant of the Firestone Tire & Rubber Co., at Akron, Ohio, died at his home in Akron on June 4 at the age of 39. Mr. Wayman was born at New Martinsville, West Virginia, and attended the Carnegie Institute of Technology. He joined the Firestone organization in 1934, went to the Liberia plantations in 1936, and served in the general laboratories from 1939 until being named purchasing agent of the company's synthetic rubber division.

New B.R.P.R.A. Publications

Included among recent publications of the British Rubber Producers' Research Association, 19 Fenchurch St., London, E.C. 3, England, are the following:

The Statistical Length of Rubber Molecules, by L. R. G. Treloar. (No. 45).

Rubber, Polyisoprenes, and Allied Compounds. Part VI. The Mechanism of Halogen-Substitution Reactions, and the Additive Halogenation of Rubber and of Dihydromyrcene, by G. F. Bloomfield. (No. 48).

Rubber, Polyisoprenes, and Allied Compounds. Part VII. Action of Nitric Oxide Thereon, by G. F. Bloomfield and G. A. Jeffrey. (No. 49).

The Molecular Weights of Rubber and Related Materials. V. The Interpretation of Molecular Weight Measurements on High Polymers, by G. Gee. (No. 50).

The Course of Autoxidation Reactions in Polyisoprenes and Allied Compounds. Part VIII. The Photo-Oxidation of Methyl-Elaidate, by Donald A. Sutton. (No. 51).

On the Calculation of Certain Higher-Order Bethe Approximations, by W. J. C. Orr. (No. 52).

Distribution of Oxygen in Oxidized Rubbers, by R. F. Naylor. (No. 53).

The Interaction between Rubber and Liquids. Part V. The Osmotic Pressures of Polymer Solutions in Mixed Solvents. Part VI. Swelling and Solubility in Mixed Liquids, by G. Gee. (No. 54).

The Structure of Polyisoprenes. Part II. The Structures of β-Guttapercha, by G. A. Jeffrey. (No. 55).

The Structure of Polyisoprenes. Part III. Ultra-Violet Absorption Spectra, by L. Bateman and H. P. Koch. (No. 56).

Most of these booklets are reproductions of articles that have appeared in the *Transactions of the Faraday Society* and the *Journal of the Chemical Society.*

Room "Mounted" on Rubber

Existence of a room in the middle of the Brooklyn, N. Y., Navy Yard, so completely sound-proof that it approaches the quiet of the stratosphere, has been revealed. The room is "mounted" on columns of rubber specially developed and installed by the U. S. Rubber Company. There are 14 of these mountings, each 16 inches in height, and they are the only contact between the room and the rest of the outside world. The room measures 18 feet by 30 feet and weighs eight tons. It is lined with deep layers of spun glass and other acoustical material which absorb sound and make it airtight. The walls are made non-parallel because sound reflection is less pronounced in an asymmetrical room than in a perfectly square one. Built around the outside of the chamber is a second room with brick walls 12 inches thick and a concrete floor 6 inches in thickness. It is equipped with a steel door weighing 3,000 pounds and mounted on roller bearings. This outside room stops many extraneous noises before they reach the inner chamber.

RUBBER and PLASTICS MOLDING with EEMCO PRESSES

Made in sizes from 12" x 12" Laboratory Press up to desired sizes, EEMCO hydraulic presses comprise a line of especially built and desIgned presses for rubber and plastics molding. No matter what your molding requirements may be, you are invited to consult with EEMCO for your needs.

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MILLS • HYDRAULIC PRESSES • TUBERS
EXTRUDERS • STRAINERS • WASHERS
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PROTECTOSEAL

CROSS-SECTION OF CAN SHOWING FIRE BAFFLES

SUPPLY CANS
WITH BUILT-IN FIRE BAFFLES

PREVENT LOSS. Protectoseal Supply Cans prevent loss by evaporation because fill opening, spout, and special vent have automatic closures. The flexible spout eliminates waste and time lost fussing with funnels. The special vent permits fast pouring; a full five-gallon can can be emptied in less than a minute.

PROVIDE SAFETY. Both fill opening and spout, as shown in the cross-section above, have double perforated fire baffles to prevent ignition of the can's contents. Heavy construction, double seamed and soldered joints, and reinforcing bottom rim ring, prevent breakage of can and loss of contents from rough handling.

REDUCE WASTE. The leakproof, self-closing valve on the spout, operated by the carrying hand, permits accurate control of pouring to eliminate waste from spilling or slopping. Not a drop of liquid need be lost.

APPROVED. Protectoseal Supply Cans, made in 3-gallon and 5-gallon sizes, are approved by Underwriters' Laboratories and Associated Factory Mutuals. *Write today for complete data on the PROTECTOSEAL line of Fire Baffle Fill and Vent Fittings, Safety Cans, Plunger Cans, and Wash Tanks.*

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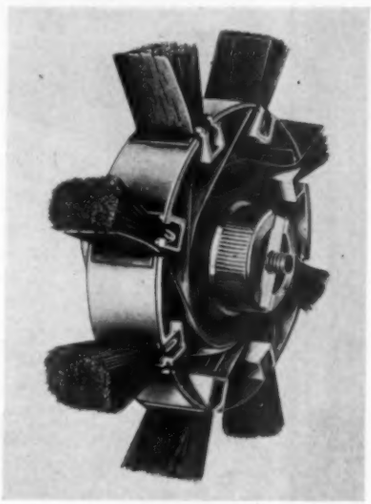
PROTECTOSEAL

NEW EQUIPMENT

Sand-O-Flex Sanding Wheel

A new, brush-backed sanding wheel which sands, deburrs, and finishes rubber products, plastics, metals, and many other types of materials, has been produced by the Sand-O-Flex Corp., 4373 Melrose Ave., Hollywood 27, Calif. This wheel was originally conceived to sand and finish small wooden and plastic aircraft parts of unusual shapes. It was soon discovered that



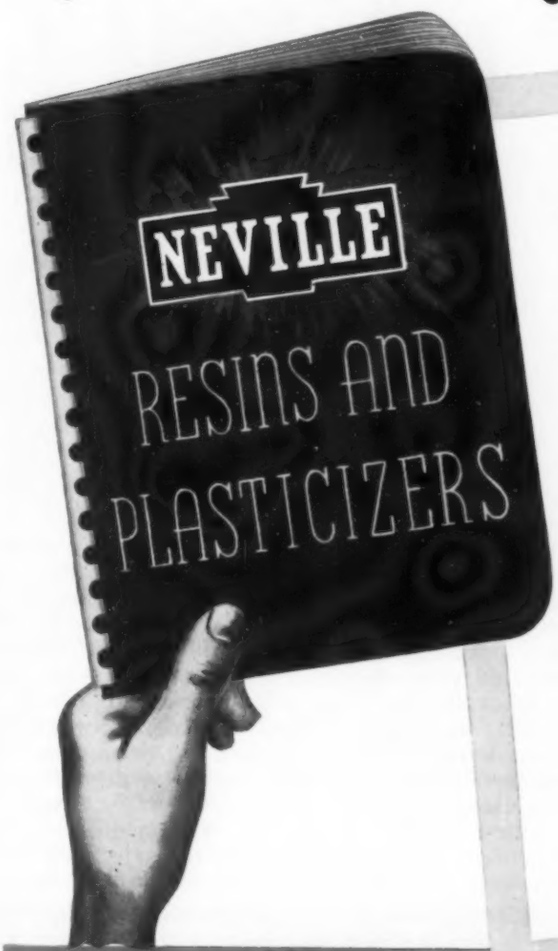
by loading it with a different abrasive, tool marks and burrs were quickly removed from metal parts. Flash from molded rubber products was instantly removed, as were varnishes, enamels and other protective coatings.

The device consists of a central magazine which houses the strip abrasive. Eight of these strips extend through the housing and are held against the work by tough bristles. The bristles "cushion" the abrasive, making it possible to get in and around corners and into hollow and fluted surfaces and small openings. Overall diameter of the Sand-O-Flex, including brushes, is approximately 8 inches, while its weight, when fully loaded, is about 2¾ pounds. Normal loading contains 20 feet of abrasive, and reloading is done simply by unscrewing the serrated nut and removing the cover. A wide range of abrasives of various grits and grades are supplied for use with the sander. These cartridges, plus the quick-charging feature, permit the same tool to be used in all operations, from rough stage to polished surface.

The sander fits all standard ½-inch and ⅝-inch motor shafts, stationary or flexible, and it can be supplied to fit almost any shaft-size on request. A ¼ h.p. electric motor will handle all normal operations, as will most portable electric tools. Motor speed of 1750 r.p.m. is recommended, decreasing in proportion to the coarseness of the abrasive used and according to the results desired. No particular skill is required to operate the machine, nor is much pressure needed. Light in weight, the sander is particularly suitable for use on a flexible shaft.

Your Guide...

TO THE NEVILLE LINE of Resins and Plasticizing Oils



IT'S Neville's latest hand-book on Resins and Plasticizing Oils, containing a wealth of information that should prove a convenient guide to the proper selection of the right Neville product to meet your problems.

In its 64 pages are listed grades, specifications and uses of each of the many Neville Resins or Plasticizers. Write for your copy today!

A-15

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Chemicals for the Nation's War Program

BENZOL • TOLUOL • XYLOL • TOLLAC • NEVSOL • CRUDE COAL-TAR SOLVENTS
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RECLAIMING, PLASTICIZING, NEUTRAL, CREOSOTE, AND SHINGLE STAIN OILS

CAPITOL PROCESS LINER TREATMENT

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Obtain Efficiency

and Economy by

using our

CAPITOL PROCESS

on your next order

for Rubber Repellent

Liners.

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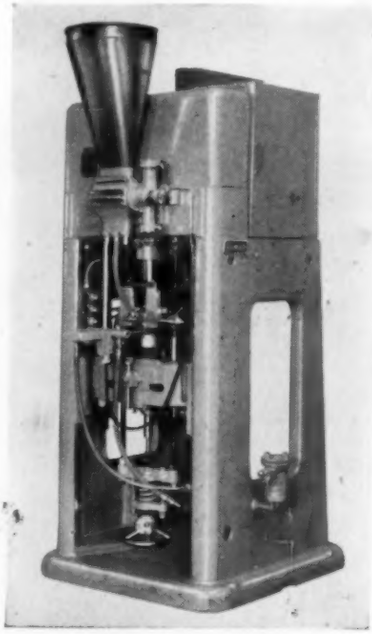
TEXTILE PROOFERS, INC.

181-193 Culver Ave., Jersey City 5, N. J.

Originators of the Liner *Capitol Process Treatment*

Improved Stokes Molding Machine

Several improvements have been incorporated in the automatic molding machine produced by the F. J. Stokes Machine Co., Philadelphia 20, Penna. Known as Model No. 200 D, the machine features such improvements as a new type trap or checking device,



sensitive to the fraction of a gram, which weighs the finished moldings and operates a safety cut-off to stop the machine in case all molded pieces do not eject into and pass through the trap. If a piece should stick in the mold or a molding be of insufficient weight, the machine will stop and signal for attention. Thus, possible damage to the mold or machine from double filling or other failure in operation is practically eliminated.

Other features of the improved model include an improved combination push-off that ejects mechanically in case the multiple air-jets do not blow the molding into the trap, as well as an improved triple-feed device that is readily adjusted to distribute exact quantities of molding powder where desired in the mold.

The capacity of the machine is 15 tons. It molds parts with a projected area up to 14 square inches and diameters up to 4 inches. Output with a single-cavity mold is up to 10,000 or more moldings per week (168 hours), and with sub-cavity molds, up to 10,000 or more per day, depending on the size of the part. The machine is self-contained, fully automatic, and thoroughly safeguarded. It requires a minimum of operating attention and is electrically heated and powered, requiring 5 h.p. only.

MOLDEZE

The Mold Treatment for Plastics and Rubber

"In all our years in the rubber business we never have seen the equal to MOLDEZE" — says Chf. Engr. famous rubber firm.

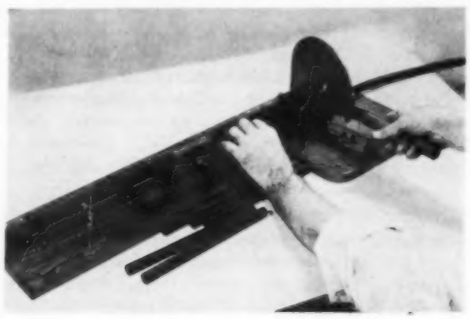
Majority of Leading Firms now use MOLDEZE

Send for 1 long-lasting pint . . . $5 delivered

PROTECTIVE COATINGS, INC., BOX 56RA, DETROIT 27

Zim Cutting Device

A simple cutting tool, specially designed to cut rings to very accurate sizes from any coil or spiral packings, called the Zim Cutter No. 2, is being manufactured by the Zimmerman Packing Co., Cincinnati, Ohio, and distributed by William-Leonard & Associates, Caxton Building, Cleveland 5, Ohio. Rubber, asbestos, duck, cotton, flax, leather, and particularly



all types of plastic packings are said to be cut easily and quickly with this device. Square butt or beveled butt joint rings can be cut most effectively. Regular beveled and even step joints can also be made. The circular knife can be adjusted to give eight new cutting edges. The tool weighs only 17 pounds and can be attached to a bench or easily carried to any location where it may be needed. The cutter can also be used when an exact length is wanted from a strip of any pliable material up to 1½ inches in width or diameter. The knife has a razor-edge, so that it cuts cleanly and instantly, and because it is round, it goes through the material on a 45° angle. Thus, it is claimed, there is no fraying, no mashing, and no pinching. The cutting blade is completely encased, so that workers can safely operate the tool by hand. It will also cut sponge or hard rubber, hose, wire, cork, plywood, cloth, felt, rope, cardboard, paper and many other materials that normally present cutting problems.

FOR HIGH TENSILE, USE PHILBLACK A

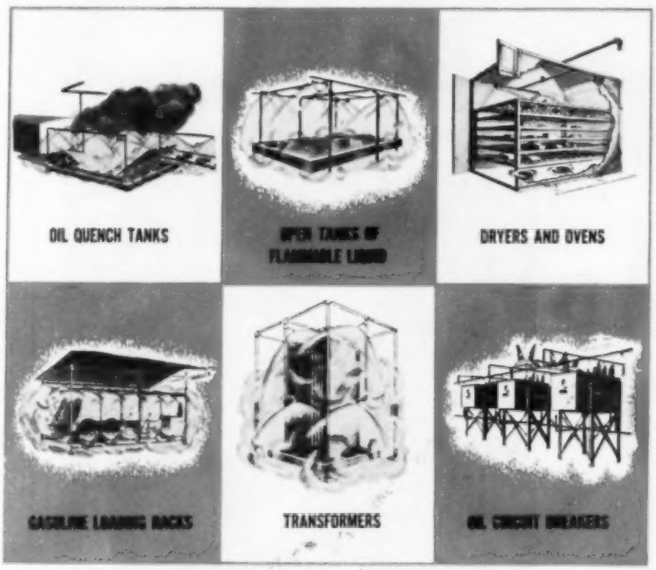
(For FURTHER DETAILS, SEE AD ON PAGE 248)

"AUTOMATIC"

FIRE-FOG Specified Protection

IT BLANKETS . IT ISOLATES . IT QUENCHES .

for these Applications:



THE industrial equipments illustrated above are typical of many that are protected from serious fires by "Automatic" FIRE-FOG Systems.

Electrical blazes and fires originating in oil storage and open tanks of flammable liquids are rapidly extinguished by properly designed "Automatic" FIRE-FOG Systems which are engineered for the effective use of water as an extinguishing agent.

"Automatic" Sprinkler

"AUTOMATIC" SPRINKLER CORPORATION OF AMERICA

YOUNGSTOWN, OHIO . . . . . OFFICES IN 36 CITIES

"Automatic" manufactures and installs a complete line of fire protection devices and systems for all types of fire hazards. Listed by Underwriters' Laboratories, approved by Factory Mutual Laboratories.

Weathering qualities of
RUBBER PRODUCTS
determined with reliable
accuracy in the

ATLAS *twin arc*
WEATHER-OMETER

Any selected cycle of exposure to sunlight and wetting can be set for automatic continuous testing in the Weather-Ometer. Exact tests can be duplicated at any time by settings on the control panel which contains temperature regulator—time meter—light and water cycle switch — automatic cut-off switch — voltage adjusting switch — direct reading thermal regulator — reactance coil (for economical current consumption). The Weather-Ometer is fully automatic in operation; can be left unattended over night; only necessary to renew carbons once in 24 hours. Years of exposure to any conditions of weathering reduced to a few days testing in the laboratory with the Weather-Ometer.

Originators and sole manufacturers of accelerated testing machines for over a quarter of a century. Fade-Ometer, Weather-Ometer, Launder-Ometer — the accepted standard testing machines used all over the world.

ATLAS ELECTRIC DEVICES CO.
361 West Superior Street, Chicago 10, Illinois

REVIEWS

BOOKS

Industrial Plastics (3rd Edition). By Herbert R. Simonds. Published by Pitman Publishing Corp., 2 West 45th St., New York 19, N. Y. 6 x 9 in. 396 pp. $5.00.

The introduction of high-frequency heating, together with the development of several important new materials since the publication of the second edition of this book (see RUBBER AGE, September, 1941, page 431), occasioned this latest edition. Several new chapters have been added, although the general arrangement of the book has been retained, and all new commercial plastics are described. The group of important plastics selected by the author for special consideration has been held at ten by substituting nylon, polyethylene and the melamines for the cellulose nitrates, casein plastics, and phenolic furfurals, the latter three having dropped below the first ten in importance. The other plastics receiving special consideration in the latest revised edition are phenol formaldehydes, cellulose acetates, urea formaldehydes, polystyrenes, vinyl copolymers, methyl methacrylates, and vinylidene chloride. The chapter on foreign practice has been changed to give emphasis to South American countries and the section on wartime plastics has been considerably expanded. As in the previous editions, brief mention is made of the synthetic rubbers. There are 14 chapters in all, plus a plastics trade name index and a cross-referenced subject index.

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The New Plastics. By H. R. Simonds and M. H. Bigelow. Published by D. Van Nostrand Co., Inc., 250 Fourth Ave., New York 3, N. Y. 6 x 9 in. 316 pp. $4.50.

Issued as a supplement to earlier books on plastics rather than as a treatise on the subject as a whole, this book brings together for the first time information on all the important plastics materials developed since 1940 and, in addition, presents a round-up of important developments throughout the plastics industry. It covers the composition, methods of manufacture and fabrication, properties and uses of dozens of new materials, some of which have reached the tonnage stage while others are still in the experimental phase. Data is included on nylon, the melamine resins, Zinlac, the silicones, Penacolite, Fosterite, the new alkyd resins, etc. There are complete chapters on new fibers, new organic coatings and adhesives, and new laminating materials. A chapter on new processes covers molding with electronic heating. A special chapter is devoted to the synthetic rubbers, with pertinent data given on Buna S, Perbunan, Hycar OR, Chemigum, Vistanex, Butyl, Thiokol, Paracon, Paraplex X-100, and Marbon S and S-1. The book has 12 chapters, an appendix giving formulas for most of the newer plastics, and a complete subject index.

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Autumn Leaves. By P. W. Litchfield. Illustrated by Rockwell Kent. Published by Corday & Gross Co., Cleveland, Ohio. 5½ x 9 in. 125 pp.

Aptly subtitled, "The Reflections of an Industrial Lieutenant," this interesting book is a distillation of Mr. Litchfield's personal and business philosophy as such philosophy has evolved in 45 years in industry. On the personal side, the chairman of the board of the Goodyear Tire & Rubber Co. discusses the value of time to the individual, the seasons of life, the influence of family on heredity, the influence of outside forces on environment, the influence of church and school on education, and obligations to family and society. On the business side he talks of business in general, the selection and training of men, the value of time to business, and lists five points for success. Some light on Mr. Litchfield's background is thrown by Dr. Jerome C. Hunsaker in a special introduction. Young and ambitious executives would do well to read this book.

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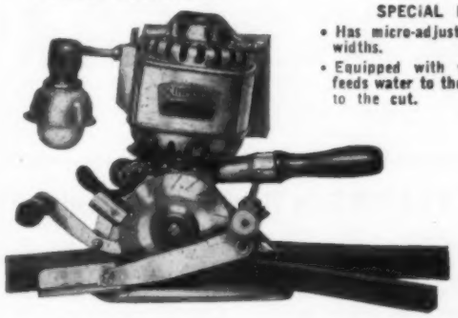

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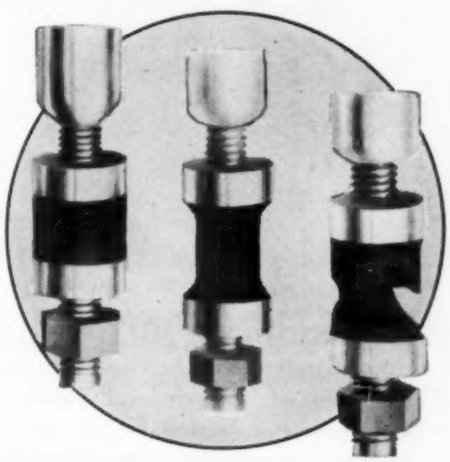

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Process Equipment Design. By Herman C. Hesse and J. Henry Rushton. Published by D. Van Nostrand Co., Inc., 250 Fourth Ave., New York 3, N. Y. 6 x 9 in. 580 pp. $7.50.

This is a practical design book prepared not for the apparatus manufacturer but primarily for the chemical engineer. It presents the fundamentals of mechanics, machine and structural elements, and economic and manufacturing considerations related to the design of process equipment, particularly for the chemical industries. All of the information is well correlated and from the fundamental facts given the book develops practical methods for the design of the widest range of chemical engineering equipment—pressure vessels, piping, gearing, shafting and bearings, belt and chain drives, attachments and closures, etc. Hundreds of illustrations show minute details and simple formulas are provided for making necessary calculations, with the required data arranged in convenient tables and graphs. Brief references are made to rubber as a lining material and to rubber belts, expansion joints and gaskets. There are 18 chapters, a section of references, and a subject index.

•

Russ's Bus. By Russell A. Byrd. Published by the Wetzel Publishing Co., Los Angeles, Calif. 5½ x 8 in. 200 pp. $2.25.

This is the inside story of the actual experiences of a transcontinental bus driver and his passengers as told by a man who has been a driver since the "pioneer" days of 1927. Adventure, tragedy and romance from the days of narrow wooden bridges and unpaved highways on the first transcontinental lines to present-day modern conveniences are described. Through mud and snow and over hairpin curves, sometimes backing up hills, walking over the grades or being stranded without a "spare," the author takes his passengers adventuring and tells about their escapades. Among the adventures described are several involved in piloting a name-band around the country. Without being didactic, the author stresses the need for safe driving and a neighborly interest in the other fellow's welfare on the road. Numerous photographs of buses, passengers, and scenery along the way are included.

•

Acrawax C. Glyco Products Co., 26 Court St., Brooklyn 2, N. Y. 5½ x 8½ in. 16 pp.

Detailed information on Acrowax C, the high melting point synthetic wax introduced by Glyco recently, is contained in this booklet. The properties of the material are listed and indexed and a number of the specific applications, including those in the field of elastomers, are discussed. In addition to its high melting point, Acrawax C features inertness and water repellency.

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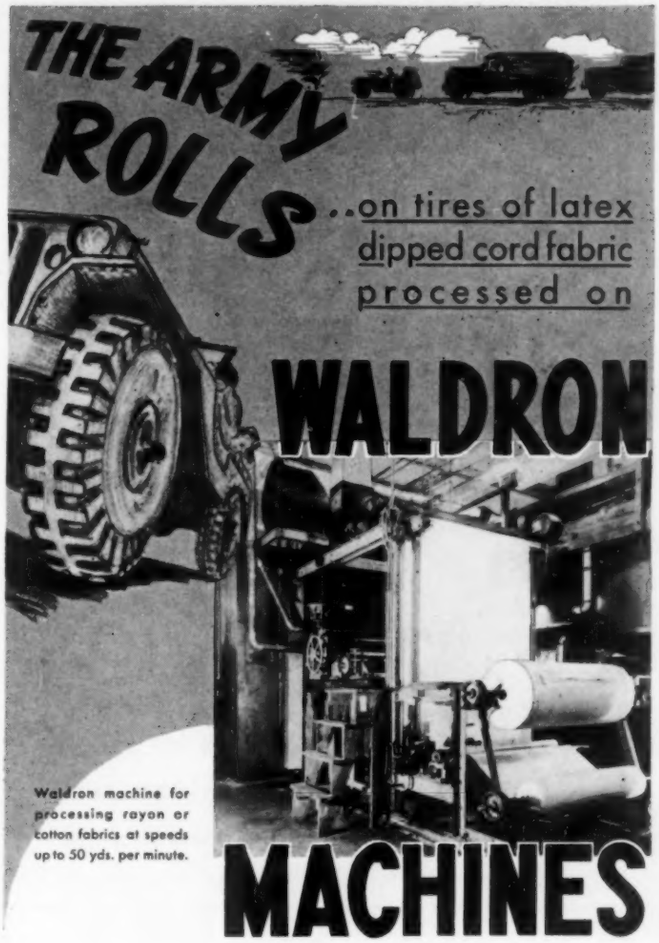
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Barrett Rubber Compounding Materials. Barrett Division, Allied Chemical & Dye Corp., 40 Rector St., New York 6, N. Y. 8¾ x 11¼ in. 36 pp.

The specifications, characteristics and behavior of the full line of Barrett rubber compounding materials, including Bardol, Carbonex, Cumar, B.R.T. and S.R.O., are provided in this technical booklet. In each case a set of detailed specifications is given, with accompanying test references, and a small amount of descriptive matter, so the chemist may best determine which ingredients meet specific applications. To supplement this information, the first of a new set of test reports is included in a pocket on the inside back cover of the booklet. This first report covers the use of various Barrett materials in GR-S tire tread stocks, GR-S molded and extruded stocks, GR-S non-black molded soling stocks, heel stocks, and miscellaneous stocks. Tension data is given in all cases, with additional test data in some.

•

What's New About Pine Tar? American Pine Tar & Chemical Corp., 233 Broadway, New York 7, N. Y. 3¾ x 9 in. 12 pp.

The advantages of Danischewsky Processed Pine Tar (D.P.P.T.) over ordinary pine tars are stressed in this booklet, with emphasis on the special rubber grades developed by the company. Data is given on tack and adhesion, frictioning of fabric, calendering of sheet, etc. Reference is also made to the application of D.P.P.T. for emulsifying purposes and for reclaiming purposes. A brief history of the pine tar industry is included. Some data on processed pine tar for the cordage industry and for marine paints is also given, in addition to data on pine tar pitch for the shipbuilding and other industries.

•

Taylor Fulscope Time Schedule Controller. (Bulletin 98165). Taylor Instrument Cos., Rochester 1, N. Y. 8½ x 11 in. 8 pp.

This bulletin describes an instrument devised by the company to secure the accurate repetition in batch processes of a predetermined program involving time, coupled with temperature, pressure, flow or liquid level. Of special interest to the rubber industry is the application of the instrument to horizontal or vertical live steam vulcanizers. Photographs of the instrument and its applications are included.

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(For FURTHER DETAILS, SEE AD ON PAGE 248)

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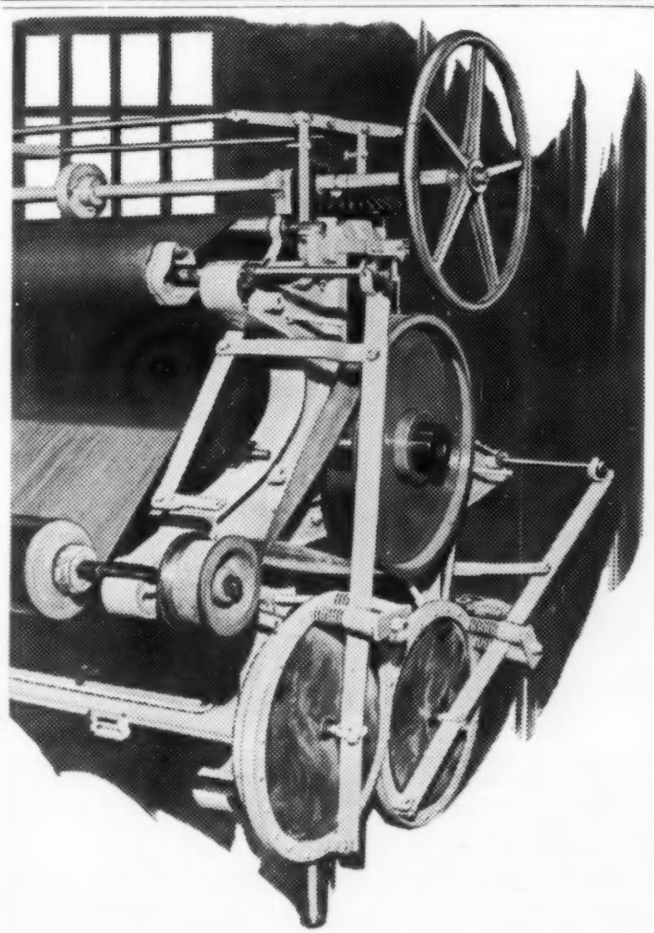

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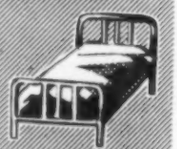

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Synthetic Rubber Mechanical Parts in Present and Postwar Vehicles. By Ellwood F. Riesing. Published by Firestone Industrial Products Co., Akron, Ohio. 8½ x 11 in. 32 pp.

This is a reproduction of a paper which the author, chief automotive engineer of the company, presented at the War Engineering-Annual Meeting of the Society of Automotive Engineers, held in Detroit, Mich., January 8-12. The booklet discusses the present and potential use of synthetic rubber in mechanical parts with respect to efficiency, low temperature flexing properties, resistance to ultraviolet rays, ozone, acid, and gas diffusion, electrical resistivity, hysteretic and elastic properties, creep and stress relaxation under load at elevated temperatures, and change in modulus with time at elevated temperatures. Included are studies of operating temperatures and tension modulus at operating temperatures and of static compression and shear modulus, and dynamic compression and shear modulus, at low frequencies (free vibration). Synthetic rubber-like elastomers as future engineering materials are also discussed. The booklet is illustrated with graphs, statistical tables, and photographs, and is accompanied by a bibliography and a glossary of rubber chemical and engineering terms.

•

The Engineering of Rubber. Giffels & Vallet, Inc., Marquette Bldg., Detroit 26, Mich. 8½ x 11 in. 16 pp.

Some of the engineering services rendered by the company to the rubber manufacturing industry, and some of the representative commissions performed, are outlined in this pamphlet. Brief reference is made to the company's experience in designing facilities for the production of tires and tubes, footwear, belting, hard rubber goods, sponge rubber products, latex products, drug sundries, insulated wire and cable, and mechanical rubber goods. Services offered include both preliminary engineering and final design engineering. Data on the company's history, business growth, and fields of operation (including rubber) in engineering and architecture, is offered in another pamphlet, available on request.

•

Wagum Synthetic Rubber. American Associated Companies, P. O. Box 1535, Atlanta 1, Georgia. 8¾ x 11¾ in. 5 pp., plus test data and illustrations.

The manufacture, processing and performance of Wagum, a new synthetic elastomer, is covered in this report. Data is furnished on working characteristics, physical and chemical properties, end uses, oil and grease resistance, fleet tests, tire temperature measurements, abrasion loss, cracking, cut-growth and chipping, and heat conductivity. Although the report is primarily concerned with the utilization of Wagum as a recapping stock, the conclusion is drawn that it is applicable to tires, inner tubes and other uses. Patents on Wagum are said to be pending.

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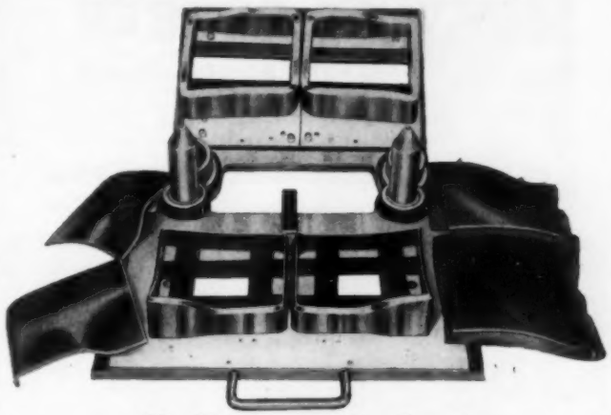

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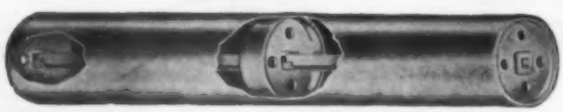

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REVIEWS (CONT'D)

Improvement of Labor-Utilization Procedures. (Bulletin No. 807). Bureau of Labor Statistics, Department of Labor, Washington, D. C. 6 x 9 in. 48 pp.(Available from Superintendent of Documents, Washington, D. C., for 10c per copy.)

This bulletin is a report, written from the standpoint of plant management, on the principles which may be used to increase production and productivity through improvements in labor-utilization procedures. Chapters are devoted to absenteeism of workers, service for employees, labor turnover, full use of community labor resources, training and upgrading, wage structure, working hours and shift schedules, supervision of workers, plant organization, plant methods, working conditions and safety, and employee morale. In addition, there are statistical tables on average absence rates, monthly labor-turnover rates, women as percent of total wage earners, extent of late-shift work, industrial-injury frequency rates, and on earnings and hours.

•

Facts About Future Planning. R. L. Polk & Co., 431 Howard St., Detroit 31, Mich. 8¼x11 in. 68 pp.

This is a report on a comprehensive study of the country's automobile owners' and dealers' plans for, and opinions regarding, the post-war era. The point is stressed that only the facts, as reported, are included in the booklet, with each fact tending toward a conclusion. The conclusions, however, have been left to the manufacturer or dealer. For instance, 76% of car owners interviewed stated they will not buy new cars in the post-war era if the retail selling price is 25 to 30% higher than prewar levels, whereas 53% of the automobile dealers interviewed stated that price increases will have very little effect on the post-war new car market. Topics covered in the report include average mileage, owner loyalty, low-priced cars, service facilities, and factory discounts.

•

Cyclone Metal Conveyor Belt. (Catalog No. 3). Cyclone Fence Division, American Steel and Wire Co., Waukegan, Ill. 8½ x 11 in. 24 pp.

The various kinds of metal conveyor belts made by the company, including chain link belts, right and left alternating weave belts, belts with chain edge construction, heavy duty and special purpose belts, flat wire conveyor belts, and flex-grid belts, are described and illustrated in this new catalog. Installation photos are shown in almost every instance. An interesting feature of the catalog is the inclusion of gauge tables.

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(For FURTHER DETAILS, SEE AD ON PAGE 248)

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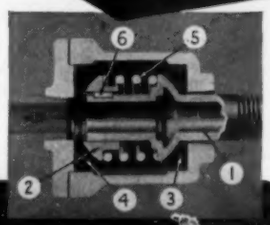

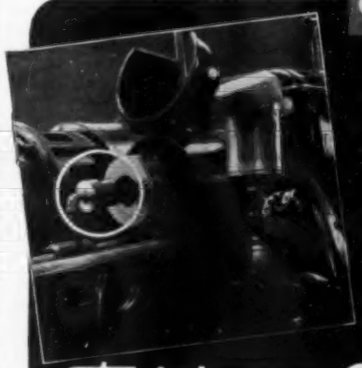

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STAUFFER CHEMICAL CO.

420 LEXINGTON AVE., NEW YORK 17, N. Y.
221 NO. LA SALLE STREET, CHICAGO 1, ILL.
624 CALIFORNIA ST., SAN FRANCISCO, CAL.
HOUSTON 2, TEXAS
555 SO. FLOWER ST., LOS ANGELES 13, CAL.
424 OHIO BUILDING, AKRON 8, OHIO
NORTH PORTLAND, OREGON
ORLANDO, FLORIDA

MARKETS

Rubber – Crude, Reclaimed and Scrap – Cotton – Ducks – Tire Fabrics – Sheetings

NEW YORK, JUNE 11, 1945

Crude Rubber

THAT the situation in crude rubber is critical was emphasized in recent weeks with the announcement by Special Rubber Director Collyer that all of the guayule crop in the continental United States will be harvested and processed within the next two years, irrespective of the length of cultivation of the crop. The crude rubber situation has reached a point where it must be considered in pounds, not tons, from now on, or at least until shipments begin coming through from the Far East. To provide facilities for processing the guayule crop within the stated period, four new processing units are being constructed.

On the other hand, another official action announced within recent weeks indicated that optimism is rising in Washington with regard to the possibility of early shipments of crude rubber from the Far East, and the fact that the Allies have landed on Borneo proper lends strength to such optimism. Anticipating the necessity of augmenting present facilities for handling the increased volume of crude rubber "which may be expected as a consequence of the reoccupation and rehabilitation of certain Far East rubber-producing areas," the Rubber Reserve Co. has appointed the Rubber Trade Association of New York as its "Distributing Agent."

In certain quarters it is believed that the appointment of the trade association at this point as "Distributing Agent" for crude rubber augurs well for the return of handling crude rubber imports to regular trade channels as soon after the end of the war as possible. Although some continued government control is expected, importers and agents will probably be allowed as much leeway as possible.

Prices shown below are ceilings set by the Rubber Reserve Company:

	C	N-C
Plantations—		
Ribbed Smoked Sheets, 1X...	22½	40
Thick Pale Latex Crepe, 1X..	22½	40
Thin Pale Latex Crepe, 1X..	22½	40
Thick Brown Crepe, 1X.....	21⅜	38⅞
Thin Brown Crepe, 1X.....	21⅜	38⅞
Thick Remilled Blankets, #1..	21⅜	38⅞
Rolled Brown or Flat Bark..	18	35½
Smoked Blankets, #1.....	21⅛	38½
Claro Brand 1XRSS.....	22½	40
Sole Crepe Trimmings.....	22	39½
Sole Crepe	22½	40
Wild—		
Uncut Fines, Crude.....	15	29
Cut Fines, Crude.....	15½	29¼
Cut Fines, Washed & Dried..	22½	40
Upriver Coarse, Crude.....	12⅜	26⅛
Upriver Coarse, Washed & Dried	20¼	37¼
Caucho Ball, Crude	11⅜	24¾
Caucho Ball, Washed & Dried	19½	37
Guayule—		
Carload Lots	17½	31
Less than Carload Lots	18	31½
Balata—		
Surinam Sheet	42½	42½
Manaos Block	38¾	38¾
Colombian Block	38¾	38¾
Peruvian Prime	38¾	38¾
Chicken Wire	23¼	23¼
Latex—		
Normal, Tank Car Lots	26	43½
Creamed, Tank Car Lots	26¾	44¼
Centrifuged, Tank Car Lots..	27¾	45¼
Heat-Concentrated, Carload Drums	29½	47

C for Civilian Use; N-C for Non-Civilian Use.

Scrap Rubber

The supply of scrap rubber continues in good volume but the problem of segregating various types of scrap, particularly synthetic scrap, continues to occupy the attention of the trade. In recognition of this problem, Special Rubber Director Collyer has appointed Albert B. Buxbaum, general manager of the Buxbaum Co., Canton, Ohio, to his staff as a consultant on scrap and reclaimed rubber. In initiating the appointment, Mr. Collyer emphasized the fact that assistance should be made available to some 250 "splitters" of scrap rubber who separate the synthetic from the natural rubber. Much of the scrap rubber now being received is synthetic and it is most important that the "splitters" properly segregate the various types of scrap. This is a step heartily approved by both the scrap and reclaim industries. Prices shown below are ceilings on typical grades of scrap:

(Prices to Consumers, Delivered Akron)

Mixed passenger tires .....ton	$20.00	
Beadless truck tires.....ton	26.00	
Mixed truck tires.....ton	20.00	
Beadless passenger tires.....ton	26.00	
No. 1 passenger peelings.....ton	52.25	
No. 1 truck peelings.....ton	52.25	
No. 2 passenger tubes.....lb.	.07¾	
Red passenger tubes.....lb.	.07½	
Black passenger tubes.....lb.	.06¾	
Mixed passenger tubes.....lb.	.06½	
No. 2 truck tubes.....lb.	.07½	
Red truck tubes.....lb.	.07¾	
Black truck tubes.....lb.	.06½	
Buffings .....ton	35.00	
Bicycle tires .....ton	15.00	
Air bags and water bags.....ton	15.00	
Boots and shoes.....ton	33.00	

Tire Fabrics

The situation in the tire fabric field remains unchanged, with practically no demand for such fabrics. Consequently, prices are nominal and in many quarters are not even being quoted. The prices shown below are those which were in force on or about January 15, 1942.

(Prices Net at the Mill)

Peeler, carded, 23/5/3.....lb.	.43½ @	.44
Peeler, carded, 23/4/3.....lb.	.44½ @	.45
Peeler, carded, 15/3/3.....lb.	.41½ @	.42
Peeler, carded, 15/4/2.....lb.	.41½ @	.42
Peeler, carded, 13/3/3.....lb.	.40½ @	.41

CHAFERS

Carded, American, 1 1/16".....lb.	.43½ @	.44
Carded, American, 1".....lb.	.39½ @	.48

Sheetings

48x40	36	in.	5.50	.....lb.	—	@ 8.272
40x40	36	in.	6.15	.....lb.	—	@ 7.398
40x36	36	in.	6.50	.....lb.	—	@ 7.000
48x48	40	in.	2.50	.....lb.	—	@17.200
48x48	40	in.	2.85	.....lb.	—	@15.087
56x60	40	in.	3.60	.....lb.	—	@12.638
48x44	40	in.	3.75	.....lb.	—	@11.733

Note: Prices shown above are ceiling prices set by order of the O.P.A

Cotton

Although the price of middling uplands has moved in the relatively narrow range of 41 points since our last report, the trend has been increasingly and steadily upward. High for the period was 23.59 on June 9 and low was 23.18 on May 11. The average price for middling uplands on the Exchange for the month of May was 23.30, based on 26 trading days. The steady gain was recorded despite uncertainty in trade circles with respect to pending price control action. Although the price dipped occasionally when rumors emanating from Washington flooded the market, broad trade demand coupled with recurring reports of reduced crops was sufficient to restore it promptly and to keep pushing it into new seasonal gains. Washington, however, remains the focal point of interest. In many quarters it is believed that the cotton grower will get parity prices for his crop next season, but there is considerable doubt as to what decision may be made regarding continuation of the purchase plan. Reports are also rife that legislative steps may soon be taken to enable domestic mills to increase production through a proposed bonus and textile ceilings reflecting parity for the raw product and allowing profit on each item. The present high prices for cotton are attributed to six basic causes, as follows: (1) Relatively small supply of free cotton; (2) Comparatively small volume of the better grades of available CCC stocks; (3) Late start of this year's crop; (4) Prospects for the continuation of the government purchasing program; (5) Strong demand for cotton textiles here and abroad; (6) Anticipation of increased exports of cotton. Quotations for middling uplands on the Exchange follow:

	May 10	June 11		
	Close	High	Low	Close
July	22.69	23.11	23.03	23.05
October	22.12	22.90	22.74	22.74
December	22.00	22.86	22.68	22.70

Reclaimed Rubber

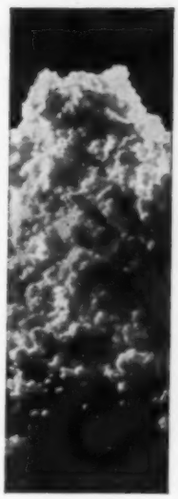
Despite the removal of restrictions on the use of carbon black, the demand for reclaim continues unabated from practically all branches of the rubber manufacturing industry. The reclaimers are still expending every effort to step up production to the 25,000 tons-per-month basis recently requested by WPB, but manpower is still the number one problem. Reclaimers are very much interested in the appointment of Albert B. Buxbaum to the staff of the Special Rubber Director at Washington and will cooperate closely in his efforts to install proper scrap rubber segregation programs in the industry. Prices shown below are ceilings on typical grades of reclaim:

Shoe			
Unwashed .....lb.	.07½	@	.07¾
Tube			
Black Tube .....lb.	.11¾	@	.12
Red Tube .....lb.	.12½	@	.12¾
Tires			
Black (acid process) .....lb.	.08	@	.08¼
Black, selected tires .....lb.	.07	@	.07¼
Truck, Heavy Gravity....lb.	.09	@	.09¼
Miscellaneous			
Mechanical blends .....lb.	.05	@	.06
White .....lb.	.13½	@	.13¾

Ducks

Enameling (single filling)....lb.	—	@	.44¼
Belting and Hose.....lb.	—	@	.39
Single filling, A grade.....lb.	—	@	.19¾
Double filling, A grade.....lb.	—	@	.20¾

For NON-MARKING
sole compounds
RAYCO FLOCK



Our "Filfloc" cotton filler greatly reduces marking when introduced into crude, synthetic or reclaim stocks. We welcome the opportunity to assist you in the proper mix for your purpose.

Request samples and prices

RAYON PROCESSING CO. of R.I. INC.
100 TREMONT ST., CENTRAL FALLS, RHODE ISLAND
Developers and Producers of Cotton Fillers for Plastics

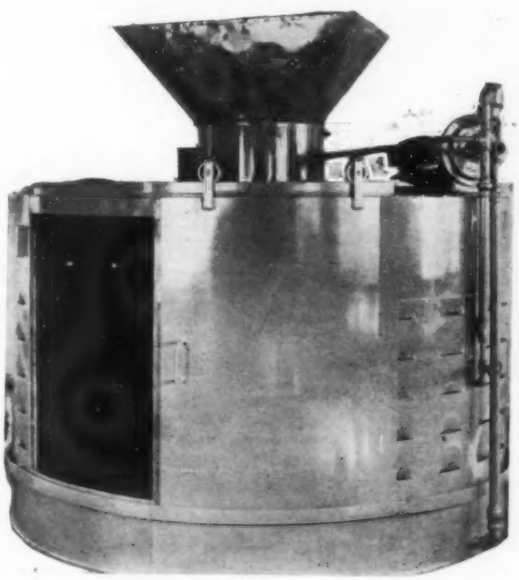
- RESIN EMULSIONS
- LATEX COMPOUNDS
- DEODORIZERS
- RUBBER CEMENT
- THICKENERS
- CURING DISPERSIONS
- PIGMENT DISPERSIONS

For Latex Compounding

— IMMEDIATE DELIVERY —

RUBBER & PLASTIC MANUFACTURERS

ADHESIVE PRODUCTS CORPORATION
1660 Boone Ave., Bronx 61, N. Y.



RUBBER SLAB COOLER

The mill room equipment at the left is used to lubricate cool and dry rubber slabs having been hand cut from a rubber mixing mill. Do that job for less money, in less floor space with cleanliness around your mills.

Simple to operate, practically no maintenance or care required.

Set in required location. No anchor bolt necessary. Connect electrical line, water and drain. It is then ready for operation. FURTHER DETAILS UPON REQUEST.

The Akron Standard Mold Co.
Akron — "The Established Measure of Value" — Ohio

CHEMICAL MARKETS

New York, June 11, 1945
All Prices F.O.B. Works

ACCELERATORS

Organic			
A-1 (Thiocarbanilid)	lb.	.28	.33
A-10	lb.	.36	.42
A-19	lb.	.52	.58
A-32	lb.	.60	.70
A-77	lb.	.42	.55
A-100	lb.	.42	.55
Aldehyde ammonia, crystals	lb.	.65	.70
Altax	lb.	.39	.41
Beutene	lb.	.59	.64
B-J-F	lb.	.34	.39
Butasan	lb.	—	1.10
Butyl Zimate	lb.	—	1.10
Captax	lb.	.34	.36
Cryiene	lb.	.40	.47
Di-Ortho-Tolyguanidine	lb.	.44	.46
Diphenylguanidine	lb.	.35	.41
El-Sixty	lb.	.36	.43
Ethasan	lb.	—	1.10
Ethyl Tuads	lb.	—	1.25
Ethyl Zimate	lb.	—	1.10
Ethylidine aniline	lb.	.42	.43
Formaldehyde aniline	lb.	.31	—
Guantal	lb.	.39	.48
Hepteen	lb.	.34	.39
Hexamethylenetetramine	lb.	.33	—
Lead Oleate, No. 999	lb.	.13	—
Witco	lb.	.15	—
Ledate	lb.	—	1.20
Methasan	lb.	—	1.20
Methyl Tuads	lb.	—	1.25
Methyl Zimate	lb.	—	1.20
Monex	lb.	—	1.25
Pentex	lb.	.74	.84
Phenex	lb.	.49	.54
Pip-Pip	lb.	—	1.63
R & H 50-D	lb.	.42	.43
R-2 Crystals	lb.	—	1.55
Rotax	lb.	.44	.46
Safex	lb.	1.15	1.25
Santocure	lb.	.60	.67
Selenac	lb.	—	1.60
SPDX-G	lb.	.53	.58
Super-Sulfur No. 2	lb.	.13	.15
Thiocarbanilid, drums	lb.	.28	.33
Thiofide	lb.	.39	.46
Thiotax	lb.	.34	.41
Thiurad	lb.	—	1.25
Trimene	lb.	.54	.64
base	lb.	1.03	1.18
Triphenylguanidine	lb.	.45	—
Ulto	lb.	.99	1.04
Ureka	lb.	.50	.57
Blend B	lb.	.50	.57
Blend C	lb.	.48	.55
Vulcanex	lb.	.42	.43
Vulcanol	lb.	.85	—
Inorganic			
Litharge, domestic	lb.	.07	.07½
Magnesia, calcined, heavy	lb.	.04	—

COLORS

Blues [b]			
Prussian	lb.	.36	—
Ultramarine	lb.	.17	.27
Browns [b]			
Mapico	lb.	.1135	—
Umber, Turkey	lb.	.04¼	—
Greens [b]			
Chrome	lb.	.23	—
Guignet's Green	lb.	.70	—
Reds			
Antimony crimson, 15/17	lb.	—	—
Indian	lb.	.08¼	—
Domestic (Maroon)	lb.	.11	—
Mapico	lb.	.096	—
Red oxide, pure	lb.	.10	.12
Rub-Er-Red	lb.	.09¼	—
Whites [b]			
Cryptone No. 19	lb.	.0560	.0585
Cryptone CB No. 21	lb.	.0560	.0585
Cryptone ZS-800	lb.	.0825	.0850
Lithopone:			
Albalith	lb.	.04½	.04½
Astrolith	lb.	.04½	.04½
Azolith	lb.	.04½	.04½
Ray-cal	lb.	.05½	.05¼
Rayox	lb.	.14½	.15¼
Titanox A	lb.	.14½	.14¼
Titanox B	lb.	.05¼	.06
Titanox C	lb.	.05½	.05¼
Zinc Oxide—American Process [b]			
American Azo:			
ZZZ (lead free)	lb.	.07¼	.07½
Anaconda, lead free	lb.	.07¼	.07½
Horsehead Lead Free Brand:			
Special—3	lb.	.07¼	.07½
XX Red—4	lb.	.07¼	.07½
Kadox, black label—15	lb.	.07¼	.07½
Red label—17	lb.	.07¼	.07½
72	lb.	.07¼	.07½
St. Joe, black label	lb.	.07¼	.07½
green label	lb.	.07¼	.07½
red label	lb.	.07¼	.07½
U. S. P.—7, bbls.	lb.	.10½	.10¼
Zinc Oxide—French Process: [b]			
Florence White Seal—7 bbl.	lb.	.09½	.09¼
Green seal—8	lb.	.09	.09¼
Red seal—9	lb.	.08½	.08¼
Yellows [b]			
Cadmolith	lb.	.55	.60
Chrome	lb.	—	.50
Mapico	lb.	.071	—

[a] Price Ceilings.
[b] Price Suggestions or Agreements.

BLACKS
(In bags, carload lots)

Arrow Compact		.0355	—
Atlantic		.0355	—
Certified		.0355	—
Certified Spheron		.0355	—
Continental		.0355	—
Disperso		.0355	—
Dixiedensed		.0355	—
Dixiedensed 66		.0355	—
Excello		.0355	—
Furnex		.03½	.06
Furnex Beads		.03½	.06
Gastex		.03½	.06
Kosmobile		.0355	—
Kosmobile 66		.0355	—
Kosmos-Dixie 20	lb.	.03½	.06
Micronex (Amarillo)		.0355	—
Micronex Beads (Amarillo)		.0355	—
Pelletex		.03½	.06
P-33		.04	.06½
Philblack A	lb.	.05	—
Shell Carbon (Del. Midwest)		.0240	—
Sterling		.035	—
Supreme		.0355	—
Thermax		.0225	.05
Wyex		.0355	—

COMPOUNDING MATERIALS

Aluminum Flake	ton	18.00	24.50
99½%-300	ton	—	16.50
86-90%-300	ton	—	13.50
Asbestine	ton	16.50	20.00
Atomite	ton	—	27.50
Barium carbonate (98-100%)	ton	47.00	49.00
Barytes	ton	25.35	36.00
Bentonite	ton	11.00	16.00
Blanc fixe, dry	ton	60.00	67.00
Calcene	ton	37.50	43.00
Catalpo (fact)	lb.	.02	—
Clay, Aerfloted, Suprex	ton	11.00	23.50
Aerfloted Paragon	ton	10.00	22.50
Champion	ton	—	11.00
Crown	ton	—	11.00
Dixie	ton	11.00	23.50
Kaolloid	ton	—	9.00
Langford	ton	—	8.50
Magnolia	ton	—	10.00
McNamee	ton	10.00	22.50
Par	ton	—	11.00
Witco	ton	10.00	—
Kalite No. 1	ton	26.00	52.00
Kalvan	ton	100.00	126.00
Keystone white	ton	—	14.00
Magnesium carbonate	lb.	.06¼	—
Mineralite	ton	—	30.00
Pyrax A	ton	—	8.10
Rottenstone (powd. Dom.)	ton	25.50	37.50
Rubberol	lb.	—	.17½
Silene EF (calcium silicate)	lb.	.055	.06
Silical	ton	65.00	85.00
Snowflake white	ton	—	16.00
Talc, domestic	ton	14.50	—
Whiting, commercial	ton	16.00	26.00
Witco	ton	—	6.50
Witcarb R	ton	—	100.00
Witcarb R-12	ton	—	40.00
Wood Flour (100 mesh)	ton	30.00	32.00

MINERAL RUBBER

285°-300° Mineral Rubber	ton	25.00	27.00
Black Diamond	ton	25.00	—
Dielex	lb.	—	.06
Hard Hydrocarbon	ton	25.00	27.00
MilliMar	lb.	—	.05½

MISCELLANEOUS

Aromatics—Rodo #0	lb.	4.00	4.50
Rodo #10	lb.	5.00	5.50
Curodex 19	lb.	2.75	—
Curodex 188	lb.	3.50	—
Curodex 198	lb.	4.50	—
Para-Dors	lb.	4.50	—
Areaklene No. 375	lb.	.35	.50
Darvan (dispersing agent)	lb.	.30	.39
Santomerse S	lb.	.11	.25
Sponge Paste	lb.	—	.18
Sunproof	lb.	.22¼	.27¼
Tonox	lb.	.50	.59
Ty-Ply	gal.	6.75	8.75
Unicel (blowing agent)	lb.	.50	—

SOFTENERS

Acids			
Acetic, 28%, bbls. [a]	100 lb.	3.38	3.63
Nitric, 36 degrees	cwt.	5.00	—
Acids, Fatty			
Laurex	lb.	.14¼	.17¼
SL-20	lb.	.11	.13
Stearex Beads	lb.	.10	.11
Stearite	lb.	.10	—
Alkalies			
Caustic Soda, 76%	cwt.	2.70	5.70
Soda Ash, 58%	cwt.	1.15	2.98
Oils			
Degras, bbls. [a]	lb.	.10	.12
Para-Flux	gal.	.17	.18
Para-Lube	lb.	.046	.048
Petrolatum, amber	lb.	.03¼	—
Pigmentaroil, tank cars	gal.	.20½	—
in drums	gal.	.26½	.27½
Pine, tanks [a]	gal.	.55	—
Rosin Oil, cmpd.	gal.	.40	—
Rubberol	lb.	.13½	.14
Rubtack	lb.	.10	—
Seedine, c.l.	lb.	.07¼	—
Witeo Palm Oil	lb.	—	—
Witco Softener No. 20	gal.	.20	—
Woburn No. 8, c.l.	lb.	.06	—
Resins and Pitches			
Pitch, Burgundy	lb.	.08	—
coal tar	ton	19.00	22.00
hardwood	ton	16.00	22.50
pine, 200 lb. gr. wt.	bbl.	—	4.50
Pigmentar, tank cars	gal.	.20½	—
in drums	gal.	.26½	.27½
Retort Pine Tar, drums	gal.	.26½	.27½
Solvents			
Acetone, pure [a]	lb.	.07	—
Benzene, 90%, tank car	gal.	.14	—
Beta-Trichlorethane	gal.	—	.20
Bondogen	lb.	.98	1.25
Carbon, bisulfide	lb.	.05	.08½
Carbon tetrachloride	gal.	.73	1.27
Dichlorethylene	lb.	—	—
Dipentene, cml., drums	gal.	.48	.50
Ethylene dichloride	lb.	.07½	.08½
Plastogen	lb.	.07¾	.12
Reogen (drums)	lb.	.11½	.15
Rub-Sol	gal.	.09½	—
Trichlorethylene	lb.	.08	.09½
Turpentine, steam dist., drums	gal.	.80	.83
Waxes			
Antisol	lb.	.22½	.23½
Beeswax, white [a]	lb.	.58	—
Carnauba, yellow [a]	lb.	.83¼	—
Ceresin, white, dom.	lb.	.13½	.15
Montan, dom.	lb.	.30	.35
Paraffin [a]			
Yellow crude scale, 124/126	lb.	.04¼	—
Refined, 120/122	lb.	.05¼	—

ANTI-OXIDANTS

Agerite Alba	lb.	1.95	2.05
Gel	lb.	.52	.54
Hipar	lb.	.61	.63
Powder	lb.	.40	.42
Resin	lb.	.43	.45
Resin D	lb.	.40	.42
White	lb.	1.23	1.33
Albasan	lb.	.69	.74
Antox	lb.	.54	.56
B-L-E	lb.	.40	.49
Flectol H	lb.	.40	.47
Neozone A, C, D, E	lb.	.40	.63
Oxynone	lb.	.77	.90
Retardex	lb.	.44½	.47½
Santoflex B	lb.	.40	.47
Santoflex BX	lb.	.54	.61
Santovar O	lb.	1.15	1.40
S.C.R.	lb.	.32	.34
Stabilite	lb.	.48	.50
Stabilite Alba	lb.	.69	.74
VGB	lb.	.43	.52

EXTENDERS

Naftolen R-100	lb.	.10	.12

LUBRICANTS—MOLD & RUBBER SURFACE

Areaklene	lb.	.35	.50
Cocoa Soapstock	lb.	.06	.08
Colite	gal.	.90	1.15
Dipex	lb.	.06	.08
Glycerized Liquid Lubricant	gal.	—	1.35
Lubrex	lb.	.25	.30
Mineralite	ton	—	30.00
Sericite	ton	65.00	75.00
Soap Tree Bark, cut, sifted	lb.	.06	.08

FACTICE OR RUBBER SUBSTITUTES

Amberex	lb.	.25	—
Amberex Type B	lb.	.18¼	—
Black	lb.	.08½	.13
White	lb.	.09	.15
Brown	lb.	.10	.14
Neophax A	lb.	.16½	—

VULCANIZING INGREDIENTS

Dispersed Sulfur No. 3	lb.	.08	.12
Sulfur Chloride, yellow (drs.)	lb.	.03	.08½
Sulfur, rubber makers			
Refined (bags)	cwt.	2.55	—
Commercial (bags)	cwt.	2.20	—
Telloy	lb.	1.75	—
Vandex	lb.	1.75	—
Vultac No. 1	lb.	.38	.45
Vultac No. 2	lb.	.38	.45
Vultac No. 3	lb.	.42	.49

RMP ANTIMONY

for RED RUBBER

- ATTRACTIVE
- NON-DETERIORATING

RARE METAL PRODUCTS CO.
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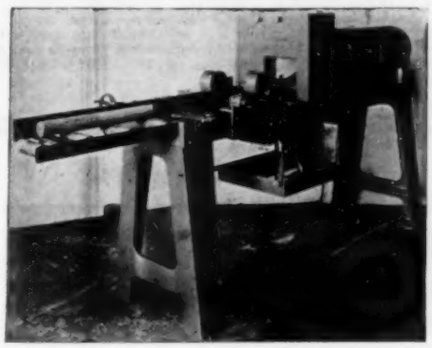

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